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JUNE 23 • 1984 • No 66

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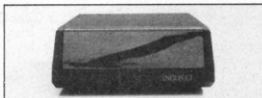
A 64K Amstrad micro with built-in tape recorder and colour monitor could be yours in this simple competition. Plus for 150 runners-up we have a range of top CDS games packages including the superb Colossus Chess.



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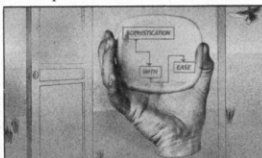
A third-party disk for your Atari opens up a range of serious applications — especially when it's bundled with a suite of serious software. Kenn Garroch takes the Indus GT for a run.



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CBM jumps gun

By Ralph Bancroft

Commodore — the holder of the Royal Warrant — is breaking the law and is inviting users to join in.

It has started to sell the communications modem for the 64 and in the process has fallen foul of the complex regulations surrounding the telecommunications approvals procedure. It is illegal to attach to the telephone network a modem that has not been approved for that purpose.

Commodore claims that it has obtained approval but so far the modems it is selling do not carry the required 'green blob' approval sticker. According to the British

Approvals Board for Telecommunications (BABT) all modems must either carry such a sticker or another displaying a red triangle and warning that it must not be connected to the telephone system.

'It is an offence for a manufacturer to sell a modem that does not comply with the marking orders,' said Mr John Ververs, director of BABT. 'It is also an offence to advertise a modem unless it carries a certain form of words.'

John Collins, who is running the modem project at Commodore, said that the reason the modems were being sold without stickers is

that they haven't been printed yet.

So far the only modems that have been sent out have gone to members of ICPUG, the Commodore users group. Some have been given free to leading club officials and some have been sold.

Mystery surrounds how and when the Commodore modem was approved. Mr Collins claims that the modem was approved last September by British Telecom. However, further inquiries by PCN revealed that the approval number that Mr Collins quoted to us is, in fact, a Department of Trade and Industry number given in the last couple of weeks.

Fox & Geller quick off mark

Hard on the heels of Ashton-Tate's announcements of dBase III and Framework come Quickcode III and QuickFrame from Fox and Geller.

Quickcode III, to be shipped here at the end of June, will not just be an upgrade to Quickcode, which allowed users to generate customised dBase II programs from menus. The company has extended the features of the package beyond simply making full use of the improved features of dBase III. Upgrades from Quickcode will be available for 'about £100'. Other dBase add-ons like dGraph and dUtil are also to be made compatible with dBase III.

QuickFrame will act as a friendly front-end to Framework, Ashton-Tate's new integrated package which makes use of dBase III, but the program, due for release in late Autumn, is still at the design stage.

Fox and Geller are now shipping R:Graph, a graphics package for the R:Base 4000 database program from Microrim which has taken the wind out of the sales of other databases like dBase II in the US. Rumours have it that the release of dBase III was brought forward to counteract R:Base competition here.

Fox and Geller also plans to follow up its management productivity tool OZ with a series of such programs, but no details were available. Fox and Geller is on 01-580 5816.

Dragon latest

Talks are continuing over the future of Dragon Data.

A number of companies are negotiating with the receiver Mr Robert Ellis of accountants Touche Ross. The most likely candidate to acquire part or all of the company is Tandy.

Tandy managing director John Sayers confirmed that it has been given the go-ahead from head office in the US to continue its talks with Mr Ellis.

'It is too early to say whether we will make a bid and if so what for,' said Mr Sayers. 'We have now been provided with an inventory of what stocks Dragon has and we still have to investigate every snag and loophole.'

The continuing uncertainty has led some dealers to slash prices on Dragon products. Shortly after the announcement of the receiver being called in, Dixons reduced the price of the Dragon 32 from £149.99 to £79.99 (with £42.75 worth of free software) and the price of the Dragon 64 was knocked down from £229.99 to £169.99. The bargains have been rapidly snapped up.

● Dragon Data's financial crisis has caused a dire shortage in the shops as dealers offload 32s and 64s at almost giveaway prices.

One person hit by this shortage is John Sayers, managing director of Tandy. 'I wanted to buy one so that our engineers could pull it apart to find out just exactly what are the differences between the Dragon and our Colour Computer,' he said.

'I couldn't get hold of one. Apparently all the 32s in the West Midlands are sold out. We have one Dragon in the office for evaluating software and in the end I had to ask my engineers to pull that one to pieces.'

This may explain why Mr Sayers is returning to Dragon's factory this week. 'I hope to pick a new machine while I am down there,' he said.

ICL ignores bandwagon

ICL has gone it alone with the launch of its Model 6 personal computer.

The UK's largest computer manufacturer has stayed away from direct IBM-compatibility, choosing the PC DOS emulation of Concurrent CP/M and equipping its micro with the network standards that will let IBM large systems users fit it into their set-ups.

The Model 6 is the smallest computer produced by ICL. It runs an 8088, has 256K of RAM, and twin 782K floppyies. It can be upgraded to its larger cousins in the ICL line, the Models 16 and 36.

The basic configuration costs £1,995. A standalone machine, it

can also support three other users at separate screens — it will cost about £400 to add each extra screen.

ICL plans to offer further expansion with a viewpoint facility and a link to Telecom Gold.

At the launch ICL pronounced WordStar, dBase II and Supercalc available for the machine, and it said that several independent software houses would be producing additional software.

■ ICL has been involved in talks over the future of the UK semiconductor maker Immos. The Government wants to reduce its 75 per cent stake in Immos and ICL is a possible destination for the company's design team.

Vanity fayre



Quick off the draw — QL accessories from 4 Systems.
By John Lettice

'You've lost your little dangle' was the battle cry at last week's Earls Court Computer Fair.

Sinclair was showing around half a dozen debugged QLS, and these models were decidedly dongleless. The attendants on the stand were cagey about delivery dates for the new clean-look Sinclairs, making hopeful noises along the lines of 'a couple of months', and the best PCN has heard so far from Sinclair is 'very soon'.

Oric celebrated the event by producing a 'key facts' sheet which detailed the official history of Oric. This doesn't include prom-

ises, so newer Oric users will be quite gratified by the accompanying announcement which promises a modem, price £100, available in July, and an 80-column printer, price £250, available in the late summer. Could these be the Oric Communications Modem and the Oric Speed Printer which early Oric literature said would be available 'during the first half of 1983'?

The GEC Dragon stand was probably the saddest, with the minders unsure of exactly who they were working for, but the new, and possibly still-born, Dragon Professional was there. The show guide was particularly distressing on this subject. 'Dragon computers will be more readily available in the High Street,' it says. 'The ever popular Dragon 32s: The double page ad from GEC Dragon. And most poignant, 'our OS9 range of business software, designed to help your business run more efficiently and profitably.' If only Dragon Data had used it. . .

Commodore was showing its new 16 and Plus4 machines, in the main clamped to the stand by huge

blue brackets which have become a rigid at the company's show stands.

Away from the industry giants, the pygmies and those of normal stature were also plugging away. Bug Byte was showing Rapsalation, a Spectrum game which the company's resident immoderate individual was describing as the next Manic Miner. It's an animated 45-frame cartoon, where you're either a bird or a fly (it makes getting the gold out of the mine that much harder) and looks to be fun.

Saga, meanwhile, erstwhile advertiser of the Crusader and Emperor Spectrum keyboards, was saying that to all intents and purposes the Crusader doesn't exist. Apparently the units that came back from the factory were such a mess that the company isn't offering them any more.

The lower-level version, the Emperor, looks good and is available.

And Fuller was there, saying that yes, there was a problem with the buffers for its extension keyboards, that they'd be on their way in the next few weeks. Contact Neil Roberts, Fuller Microsystems, Vansky House, Seel Street, Liverpool L1 4AU.

QL ROM ready now

By John Lettice

The production version of the QL's ROM is now ready, and should already be with some customers. The first of the double-free versions are due to go out very soon, still with the operating system on EPROM, and although the ROM version won't be out for a while this isn't a problem for consumers.

News on the expansion of the system, including, we assume, the hard disk, is due in the next month or so.

Typing PRINT VER\$ will tell you the operating system designation of your machine, and if you've got the latest you should get 'AH'. Sinclair hasn't used the standard 1.0, 1.1 and so on designation for the QL's OS, but instead has plumped for a semi-random lettering system.

The earlier systems which went out to customers were FE, while Sinclair has an intermediate sample version, PM, which wasn't intended to be shipped to customers. The PM system is practically identical to

AH, with only two further bugs being corrected in the later version. PCN has seen a PM version and if we take Sinclair's word regarding the last two bugs, the QL should now be bug-free.

The undeclared array bug is one of the more significant that has been corrected. Using PRINT A\$(10,10) before dimensioning the A\$ array causes a crash on the FE. Clearly a bug of this sort is a real hair-tearer for the sloppier programmer, but it has been corrected on PM and AH.

Renumbering was also a problem on the earlier version, in that RENUM did not renumber a RESTORE statement. The RENUM command is now fast and effective, and there seem to be no problems with it. Microdrive handling also seems to have been cleaned up. If you load the Clone program from the Pison applications packages then list it, you'll find that the core of it is a line that goes:

```
COPY "MDV2" &A$ TO "MDV1" &A$
Strip A$ into this and you'll find that this also has quotes round it, in the
```

form Boot, and all this made for pretty convoluted syntax, but this has now been honed down to COPY mdv1 filename TO mdv2 filename.

The editor is also functioning now. Instead of returning a bad line error and throwing the line away, you now get the line back to edit. If you type in a line so long that it scrolls out of the editing window you can still only get the cursor back as far as the beginning of the window, but lines of this length are few and far between.

The 'high number' crash is still present on the PM, but should have been fixed on the AH. The bug is question is PRINT 9.999999615-9.9999999E615, and the fact that exotica of this sort are being attended to is evidence of a certain amount of willing on Sinclair's part.

The Pison software still seems a little provisional, with 'no information on . . . turning up every now and again, but they're broadly usable. Sinclair says the current versions are pretty well at produc-

tion level. The whole system now begins to look like a credible business machine (the word Sinclair uses is 'professional') but there are still a number of qualifications to this. First is the fact that the QL cannot operate as a workhorse machine until it is sold with the final ROM inside the machine. If you have an EPROM system that is totally internal there's no real reason to have it changed for ROMs, but a business user simply cannot afford the dislocation caused by having to send a machine back for modification.

Besides this, and despite what Sir Clive says (issue 65), the keyboard doesn't shape up for touch-typing. The problem here is that, while it's tolerable compared to many home micros, if the QL is to be judged as a business machine it has to have a keyboard comparable to that of the IBM and its compatibles.

Apart from feel, the keyboard is completely flat. Three clip-on legs tilt it but don't provide any pitch.

Unix push at Earls Court

The Software '84 show at Earls Court marked the beginning of a major attempt to open the UK market to the powerful operating system Unix and Unix-like systems.

Several Unix systems and applications were on show and the show's sponsor, IPC's Software Magazine, is supporting a Unix Standards Award organised by Sphinx, a major Unix software distributor.

Sphinx is now offering Xenix (the commercial version of Unix) on the IBM PC and Lisa 2, and several applications packages are available for the machines. Xenix offers multi-tasking, multi-user operations, allowing a PC to be shared by the other terminals. Software support includes Multiplan, Microsoft's successful spreadsheet, Performix, a relational database management system and Unixplex, a word processing package.

The Xenix system comes as three modules, the operating system (£645), the software development system (£920) and a text processing system (£770).

The suite will cost £1,868 for the PC, while the Lisa system will sell for £1,948.

While there is much interest in 'integrated' software, notable absences from the show were Lotus, due to release Symphony, and Peachtree, whose Decision Manager will also be available soon.

● PCN reviews the Unicorn Unix system for the BBC next week.

Quicksilva speeds ahead



New lease on life — Quicksilva.

Quicksilva's takeover by Argus seems to have given the software house a new lease of life. Licensing agreements with Atari and Walker Books were announced recently and Quicksilva has released new programs and conversions.

A new arm, Quicksilva Eduata-

tions (sic) Division (QED), has been established to exploit the burgeoning area of home educational software, particularly in the pre-school and primary areas. Quicksilva's licensing deal with which children's publisher Walker Books will result in interpretations of books in program form. QED will extend its range to other ages.

The first game to be issued under the Atari pact will be Battlezone. Quicksilva is proud of the deal, even if the game may not look too interesting. Games '84, a Spectrum game featuring six Olympiad events, will be launched at the start

of the Olympics and is being written by Software Studies, responsible for the Games Designer.

Among the releases are Drum Kit (BBC), Gatecrasher (Spectrum, BBC, Electron), Electro-Art (Electron) and Traffic (Commodore 64), while conversions of Velnor's Lair and Mined Out are now being offered for the Oric/Atmos micros.

Quicksilva claims it will remain unbiased toward Argus publications and hopes this will be reciprocal.

It sees the main benefit of the change of ownership as giving financial stability at a time when some software houses are struggling.

Torch signs Graduate

By Ralph Bancroft

As predicted by PCN, Torch Computers has signed an exclusive agreement to manufacture and distribute the IBM-compatible Graduate add-on for the BBC micro.

Under the terms of the agreement signed last week, Torch will have world wide rights to the Graduate which will be manufactured in Torch's factory in Wales.

The Graduate was designed by Data Technologies, a company set up by former Torch chairman Martin Vlieland Boddy.

It connects to the Beeb through the 1MHz bus and offers an 8088 processor, up to 256K RAM, two floppies and two IBM compatible

expansion slots. Prices start at £599 for the 128K RAM, single drive box rising to £999 for the top of the range model.

Torch plans to sell the box under its own name through its dealer network. 'We will start shipping it in August,' said Bob Gilkes, Torch's chairman. 'But not in tremendous quantities because of the continuing chip shortages. We are confident that we will eventually overcome those shortages.'

It was perhaps inevitable that Data Technologies would end up signing some kind of agreement with Torch.

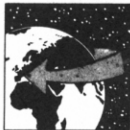
When he left Torch Mr Vlieland Boddy indicated his intention to produce an IBM-compatible add-

on for the BBC micro and there has been some degree of cooperation between the two companies since.

Torch announced that it was to market an 8088 add-on to its Z80 board for the Beeb at the same time that Data Technologies announced the Graduate (issue 61). This was always seen as a stop-gap exercise as Torch was buying the boards at a high cost from the United States.

Ray Anderson of Torch said at the time that Torch had approached Data Technologies to design an 8088 board that could fit inside the BBC in the same way as the company's ZEP 100 Z80 board. Clearly they decided to take the cooperation to its logical conclusion with last week's agreement.

VIEW FROM JAPAN



Thoughts on the passage of time

By Serge Powell

Time's winged chariot has caught up with one of the prime movers in an earlier phase of technology, and there will be malicious gloating throughout the land of Switzerland as a consequence.

With the watch business not exactly booming, Citizen has turned to pastures new — in the peripherals line. There are innumerable ironies here; while the Swiss watch-making industry stages a comeback (as clock-watchers realise that they don't necessarily need a digital device that will glow in the dark at five fathoms) Japanese high technology is attacking Citizen's wrist-based market with micros like the Seiko device.

You may consider a watch as a peripheral of sorts, but Citizen is taking no chances with the vagaries of fashion and is aiming for the accepted middle-of-the-road peripheral device. At the International Business Show here it demonstrated a brace of dot-matrix printers and a 3½in floppy disk drive. It hasn't announced prices yet but you can bet there will be no built-in real-time clocks.

The show exposed a number of flaws in the reasoning of some other established and well-respected companies. Fujitsu, for example, was anxious to steer this reporter away from personal computer products and towards brochures on sundry bits and pieces for the original equipment manufacturer market. Perhaps this was because it hasn't come up with anything new in the PC line recently.

No such luck at the Hitachi stand. Hitachi was hard at work pushing humanisation, which, we are told, means 'humans expressing their will through office automation machines'. If this is an example of the kind of thinking behind Hitachi, no wonder the company was savaged by IBM.

Struck by the aptness of IBM's own slogan — 'Think' — I dwelt at length in a quiet corner on the meaning of humanisation. How would you express your will through an office automation machine? Thrash the word processor to within an inch of its life? Give the digital PBX a good talking-to? Hitachi's approach seems to involve less violence and correspondingly less human satisfaction, but perhaps it embodies some barely tangible truth about the relationship between men and machines. A glimpse behind the veil, if you like.

On the periphery of the show, away from Sanyo still plugging the MBC 555, and Sharp still plugging Japanese word processing, was a product that should benefit from some humanisation. From a sparking thread of wire an electronic stapler was determinedly producing 5,000 staples.

A far more substantial illustration of the compromises that technology is forcing on us was on display from a company called Amano. It should be of acute interest to any union leaders who browse through PCN. Amano's product computerises the time recorder at the work place 'to greatly contribute to effective attendance'.

This is the country, you may remember, where there was talk some time ago of industrial robots being invited to join a trades union. The prospect of a dues-paying robot clocking-on under the watchful eye of a silicon Big Brother has more than a whiff of Alice through the Looking Glass. Isaac Asimov's laws of robotics may need to be updated to cover strikes.

But at least Amano's application involves a clock — a digital clock, moreover, and that should wipe the smirk off Swiss faces. Citizen may have branched out just in time.

It will have to get out of peripherals, of course; this market is as badly overcrowded as the watch business. If all the suppliers of 3½in disks were laid end to end Hitachi would probably trample them into the dust or humanicate them.

What Citizen needs is a cheap, trusty little system box of the kind that abounds in Japan. To this it can add its undoubted expertise in chronometers, and put together a device that can be relied on to cut out whatever feather-bedding remains in Japanese industry.

It's astonishing, really, that it didn't think of this for itself — but we can all learn something from IBM, can't we? Think!

PC cuts spur on competition



IBM User Show: dominated by micros.

'You don't need a weather man to tell which way the wind blows'. At the IBM User Show at Wembley last week the wind was off the Beaufort scale.

The show wasn't totally taken over by micros but most of the stands and most of the carefully-timed product launches were aimed in one way or another at the IBM PC. This, remember, was the IBM User Show: a celebration of sorts of the largest computer company in the world. The PC User Show isn't until next month.

IBM disdains to exhibit at these events and pride of place was held by ICL, which last week launched its Model 6 personal computer (see page 2). The Model 6 isn't intended as an IBM lookalike — unlike the Olivetti M24, the STC Xtra and the Zenith PC, two of which were making their first public appearances in this country.

Away from the systems there were PC cards, peripherals and soft-

ware, and the seminar programme running alongside the show also jugged its forelock to the PC. Consultant Fred Lamond predicted that by 1989 RAM memory prices could be down to \$250 per megabyte, and Professor Martin Healey gave a forecast of what the IBM Popcorn should look like — based on the Intel 286.

Talk at the show concerned the price cuts IBM applied in the US only to the PC line last week. The last time IBM UK cut prices it almost instantaneously ran out of PCs to deliver, and it is still recovering.

Regardless of such pricing foibles, the Wembley crowd was determined to be competitive, either with IBM or with each other. Zenith, besides launching its PC (128K, 360K floppy for £1,695) and previewing its ZIP luggage (Issue 59 — deliveries to begin in volume in August), gave a run out to its PC-compatible monitor, the ZVM-124. This unit costs £128 and the only close competition comes from Microvitec.

Cobol champion Micro Focus proudly proclaimed its rights to Sourcewriter, a Cobol applications generator; CPS Data Systems announced multi-tasking under (or, more accurately, around) PCDOS; Newbury Data Systems demonstrated a new PC-to-XT conversion subsystem. Elsewhere the dinosaurs weren't inert and the occasional mainframe product surfaced.



2001 — AN ODDITY — If you think that the last thing the world needs is yet another IBM compatible micro, you may well be right. But Otrona Advanced Systems would like you to think again. It claims 'virtual 100 per cent compatibility' — for its 2001 and luggability in the lightweight division (under 20lbs for a single drive model). It also says it's affordable at £2,155 for the 256K RAM, dual disk model. Further details from Puma on (08893) 3082.

RM products cross the pond

Ryan McFarland is taking steps to change its current low UK profile to compete with Microfocus.

RM is well-known in the US for its Cobol on a number of machines, from mainframes to Z80s. With these in the foreground it also announced the release of a number of new packages in this country last week, including COS (an operating

system), Cobol 2.0 and Fortran for the IBM PC and Convergent Technologies machines, Cobol and Fortran for the Unix system 3.6, and Cobol for the Fortran 32:1V and the Aprioc.

Ryan McFarland will be announcing additions to its current range of languages in the near future.

Music maestro please

The marriage of home computers and micro-controlled musical keyboards looks set to do for composition what word processing does for writing — sparing you the donkey work.

Rosetti, one of Britain's leading music companies, has unveiled a range of hardware and software that gives Spectrum and Commodore 64 owners the power of a large recording studio. Add a musical keyboard, interface and software and you can use your micro as a multi-track recording, mixing and editing console.

The key to the systems is an

interface called MIDI (Musical Instrument Digital Interface). MIDI is a serial device that can control up to 16 instruments at once. It first came under the spotlight in February at the music industry's annual show in Frankfurt (issue 50).

It has quickly established itself as the standard interface in the field, and the leading manufacturers — Yamaha and Roland with Casio following — already offer MIDI keyboards.

On show were two versions of the interface — the standard unit at £90 offering multiple input/output con-

nections allowing the addition of gadgets like drum boxes, sequencers and foot pedals; and a £20 mini version offering one input and two output sockets for the Commodore 64 only.

The impressive part of the system is the software. The composer programs allow 12-track recording on the 64, and eight tracks on the Spectrum, using disk or tape for storage.

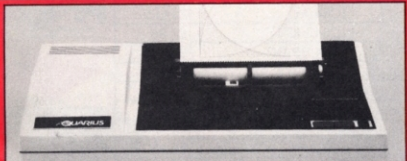
You can edit your compositions before playing them back through one or more instruments in polyphonic sound. You can further alter the sounds on playback via the

musical keyboard. The composers cost £50 each.

One point to note is that the systems do not use the sound facilities of the micros. The computers act as storage, editing and control devices for the musical keyboards.

Other products either ready or 'coming soon' include arpeggiators that allow you to store up to 40 chords to be played back in sequence, extended sound sequencers, and a pre-defined sound library on disk.

If all this is music to your ears, call Rosetti on 01-253 7294.



WATER COLOUR — With an eye for the each-way bet Radofin has launched its four-colour printer/plotted for the Aquarius and for the Spectrum, using Interface 1. The unit offers a choice of 40 or 80 columns in print mode, has blue, red, green and black pens, and manages a steady 12cps. The price of £119.95 includes cables, spare rolls of paper, and instruction manuals. The printer/plotted (available in issue 63) is one of a line of peripherals that Radofin has produced for the Aquarius; others are a data recorder, mini-expander, RAM packs and a thermal printer.

Ashton-Tate in joint venture on IBM networks

dBase/Answer gives corporate users of dBase II full query access to mainframe IBM databases.

The product, a joint venture from Ashton-Tate and Informatics, extends conventional micro-mainframe communications by allowing the PC user to define search criteria for information download. Databases supported include IMS, IDMS, Total and Adabas.

On the DP side, the package allows full data access security restrictions at file, record, field and

value levels and source files cannot be updated by PC users.

dBase/Answer can convert downloaded data for use with dBase II, dBase III, Friday! and Framework. Data files can also be uploaded to the mainframes for further processing.

The package will be available from June 28; a typical system for a mainframe with 50 PC users will cost in the region of \$45,000. Contact Informatics on 01-242 0770 for details.

SOFTWARE

The new releases



Cavelon — Ocean circles the round table.

Games

Spectrum: Just in time for the close season Cases Computer Simulations (01-858 0763) has released United, in which you accept the challenges facing a football manager trying to take his team from the fourth Division to the League Championship. You can compete against other 'managers' through United's postal league (contact Alan Parr, 6 Longfield Gardens, Tring, Herst HP23 4DN). The game costs £5.95. Crystal Computing (061-236 5571) has launched It's the Woolf for 16K and 48K Spec-

trums — if you were at the Earls Court Computer Fair on June 14-17 you could see it there.

Commodore 64: Ocean Software's (061-832 6633) Cavelon is also available for the Spectrum. Borrowing loosely from Arthurian legend it is a maze game featuring the faithless Guinevere and winged Pegasus. The Commodore version costs £6.90, the Spectrum £5.90. Software Projects (051-428 7990) says that the Commodore 64 version of Jet Set Willy is almost ready.

Colecoision: Activision cartridges like Pitfall and River Raid have been converted into Colecoision format and should be in the shops now. They cost £29.95 each.

Dragon, Tandy Colour: Crystal Computing has also released Tube Way Army.

Variou: Adventure International (UK) (021-643 5101) expects to be putting 'Scott Adams' this week. Formats for the Spectrum, BBC, Atari, Apple, Dragon, Commodore and Tandy machines are ready at prices that range from £7.95 to £17.95.



Activision converts River Raid for Colecoision.

Business

Commodore 64: Bubble Bus has repackaged four of what it calls its 'serious' programs in an offering called Quadrillion. There's a word processor, label and poster printers, and a routine that puts out a moving musical message. The package costs £14.95 — Bubble Bus is on 0732 355962. At the end of this month Richard Shepherd (06286 63531) expects to have Autocall on release. This is a spreadsheet costing £14.95 on tape and £19.95 on disk.

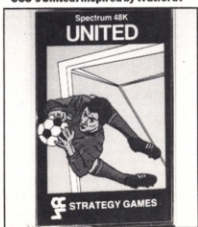
Education

Oric: CDS Micro Systems (0302 744129) has launched Word

Search, an anagram forming game, for the Oric 1 and Atmos. It operates with a time limit and when you run out of time it prints out the possibilities that you didn't get to. It costs £6.95

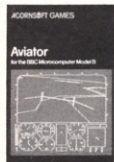
CP/M: Training for businessmen is what Transdata has in mind for the Microtext authoring system. Microtext is supposed to allow relative novices to produce computer-based training courses. Transdata is on 0705 486556. Try it on your granny — she's a relative.

CCS's United: inspired by Watford?



PCN CHARTS

GAMES



	GAME TITLE	PUBLISHER	MACHINE	PRICE	
▲	1 3	Jet Set Willy	Soft Projects	SP	£5.95
▲	2 4	Code Name Mat	Micromega	SP	£6.95
▲	3 —	Beach head	US Gold Access	C64	£8.95
▼	4 2	Pystron	Beyond	SP	£9.95
▲	5 —	Sabre Wulf	Ultimate	SP	£5.50
▲	6 1	Trashman	New Generation	SP	£5.95
▼	7 5	Fighter Pilot	Digital Integ	SP	£7.95
▼	8 6	Space Pilot	Anirog	C64	£7.95
▶	9 9	Atic Atac	Ultimate	SP	£5.50
▲	10 18	Solo Flight	Microprose	C64,AT	£14.95
▲	11 8	Flight Path 737	Anirog	C64,VIC	£7.95
▶	12 12	Hunchback	Ocean	C64,SP,DR	£6.90
▲	13 17	Night Gunner	Digital Integ	SP	£7.95
▲	14 24	Internat. Football	Commodore	C64	£8.95
▲	15 —	Mugsy	Melbourne House	SP	£6.95
▼	16 7	Blade Alley	PSS	SP	£5.95
▼	17 11	Blue Thunder	Wilcox	SP,AT	£5.95
▼	18 16	Blogger	Alligata	C64,AC	£5.95
▲	19 —	Ad Astra	Gargoyle	SP	£5.95
▲	20 28	Sheep In Space	Llamasoft	C64	£5.95
▲	21 —	3D Lunar Attack	Hewson	SP	£7.95
▼	22 13	Forbidden Forest	Cosmi	C64,AT	£8.95
▼	23 15	Scuba Dive	Direll/Martech	SP, C64,OR	£6.95
▼	24 19	Chequered Flag	Psion	SP	£6.95
▲	25 —	Jack & The B'stalk	Thor	SP	£5.95
▼	26 20	Zodiac	Anirog	C64	£7.95
▲	27 —	Aviator	Acornsoft	BBC	£14.95
▼	28 10	Manic Miner	Soft Projects	SP,C64	£5.95
▼	29 14	The Boss	Peaksoft	C64	£8.95
▼	30 25	Aztec Challenge	Cosmi	C64,AT	£8.95

MICROS

Top Ten over £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▲1	2	IBM PC	£2,390	IBM
▼2	1	APPLE III	£2,755	AP
▶3	3	ACT Sirius	£2,525	ACT
▲4	9	DEC Rainbow	£2,359	DEC
▼4	4	ACT Apricot	£1,760	ACT
▲6	8	Televideo TS1603	£2,640	TH
▼7	6	Kaypro	£1,604	CKC
▼8	5	Wang Professional	£3,076	WANG
▲9	—	Philips P2000	£1,484	MD,KDS
▶10	10	NCR Decision Mate V	£1,984	NCR

Top Ten up to £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▲1	2	Spectrum	£99	SI
▼2	1	CBM64	£199	CBM
▲3	5	Vic 20	£100	CBM
▶4	4	Electron	£199	AC
▲5	7	Oric Atmos	£175	OR
▼6	3	BBC B	£399	AC
▼7	6	Memotech 500	£275	MTX
▶8	8	Dragon 32	£175	DD
▲9	—	Atari 800XL	£250	AT
▶10	—	Oric 1	£100	OR

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the fortnight up to **June 7**. The games chart is updated every other week.

Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month.

PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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French/fun	CDS	£5.80			
Ant attack	QS	£5.90			
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Jet Pac	ULT.	£5.00	Oric Base	TAN	£12.50
Lunar Jetman	ULT.	£5.00	Oric Calc	TAN	£12.50
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Space Pilot	ANIR	£6.95	Word Search	CDS	£4.90

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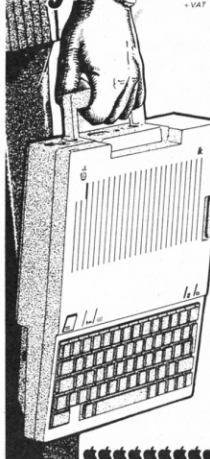
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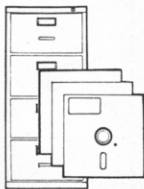
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Fuller comes under fire again

I could not suppress a wry smile on reading the reply to Dr B J Kam's query on the Fuller FDS keyboard (Routine Inquiries, Issue 63).

I purchased an FDS last February, and on installing my Spectrum experienced similar problems. I returned the keyboard by recorded delivery with the request that the purchase price be refunded. To date I am still waiting, despite several letters and phone calls to Fuller. I have just issued a summons in the small claims court in a final bid to get my money back.
C B Nowell,
Beaconsfield, Bucks.

Last week at the Earl's Court Computer Fair, Fuller pledged that its problems were over, except for the keyboard buffer. And they promised to help PCN readers still waiting. So, we'll see. — Ed.

Sinclair's secret designs on France

As I was looking through my Sinclair QL brochure I had a close look at the picture on the last page and discovered that the manual shown is in French. This raises several important questions:

PCN £10 Star Letter



- Is Sinclair after Oric's number one spot in France?
- Could this be the cause of the delays? Are all the early QLs going to French buyers?
- Could this be why early buyers are not getting manuals.

B Reid
Newport-on-Tey, Fife

Mon Dieu! Zut! Wat is 'e thinking oef, zis crazy English mild? — Ed.

Conflicting reports on the QL

I am bewildered, confused and frustrated. How is it possible for PCN to publish two such conflicting test reports on this computer? I refer, of course, to Geoff Wheelwright and Ian Scales' report in PCN issue 47 and John Lettice and Kenn Garroch's comments (issue 62).

On the strength of Geoff Wheelwright's report I placed an order with Sinclair for a QL. This has now been acknowledged and delivery anticipated at the end of June. After reading the latest report I am feeling extremely worried.

Obviously the reports were based



Would you like to see your name in print? Here is your chance on PCN's letters page.

on the engineer's actual findings at the time of the test and represent their personal opinion, but they do little to convince me that I have made the right decision. Can the keyboard be considered suitable for business purposes, or is it really such a weakness?

I would be pleased to have your professional advice.

E J Welton,
Sutton, Surrey.

The first report comprised a first look at a very early version minus the software. The second is hands on the not-quite-finished edition. The difference was enormous — about as big as the changes in the finalised version promise to be. My advice? Wait until we review the finished job, try the keyboard yourself, and read Sir Clive's promises in last week's issue. — Ed.

Is Billboard a haven for pirates?

I have decided it is time for me to have my rightful prattle.

The first of my niggles is your second-hand software advertisements. I know you have defended yourselves previously on this subject but nevertheless there are some points (one anyway) that remains unmentioned.

First I must re-state the fact that most (at least 90%) of the software advertised has been copied by the seller, distributed around a circle of friends to copy, leaving him free to sell the original. This is not illegal (as long as copies are not sold) and has neither the legal or moral obligation to stop advertising the software.

However, most software carries words to this effect. 'This program may not be re-sold without the prior permission of X software house', and it is this indisputable statement that is being ignored by your magazine and the copiers.

Whilst I'm on the subject of software, I think people should stop moaning about the high price of cassette software. As long as prices do not get Atari-like I think the programmers have the right (so do software houses for that matter) to collect decent rewards for their creative and hard work.

After all, if it wasn't for the lure of software — in the first place, many of us wouldn't have bought our micros.

My final point on software is an attempt to undermine the main software scenario. I'm sure you know it off by heart — 'You are the last human being. It is your task to defend the Earth with your super-snazzy spacecraft and its Umpty-Seven on-board computers'. Well, what I can't understand is why the spaceship manufacturers don't bundle in some shape-recognition software and an automatic missile launcher, to eliminate the need to expend a life.

Martin Dimoglou,
Colchester, Essex.

But only original cassettes should be sold through Billboard, and we've no way of knowing whether or not they have been copied before resale. We don't encourage this; neither can we do anything about it. — Ed.

Software lending made acceptable

I think I have a short-term solution to Britain's problem of tape libraries and software lending companies which increase the possibility of tape copying.

Why not pay the software house a duty of, say, one fifth of the price of hiring its tape out to a customer? This would mean software manufacturers would be less hostile towards lending libraries and that they, the software producers, would be gaining reasonable revenue from every tape lent.

For example, if I went to a

lending library and hired a tape for £1, 20p of this would go to the manufacturer (instead of nothing which is the situation at present) and the rest of the money would go as normal to the lenders. This would mean lending prices would go up and also that the software manufacturers would get some benefit from the pirating as there seems to be no solution to pirating at the moment.

I haven't a clue about the long run, but this idea may just give the software manufacturers time to get a long-term, feasible idea underway.
S A Weir,
Livingston, W. Lothian

Lynx owners come in from the cold

Would you kindly mention in your magazine that I shall be forming a new user group/magazine for all Lynx owners.

The group will be called the Lynx Users Group or LUG for short. It is the intention of this new group to promote and retain interest in the Lynx, to minimise the likely feeling that any Lynx owner is 'out in the cold'. Among the proposed actions will be to encourage owners to speak to their local membership, and to put owners in touch with those who have more programming skills.

LUG will be taking over from NILUG, as Mr R Poate has decided to close NILUG as from the June issue.

R B Jones, 209 Kenton Lane,
Kenton, Harrow, Midds.

Kempston offers four alternatives

I refer to my letter dated June 1 which was mainly about Fuller service but also commented on the Kempston Interface 6.

Kempston has written to me again and offered me four courses of action:

- a temporary modification,
- wait for a permanent solution,
- exchange for Interface 5 plus refund of the difference in price,
- a full refund.

I am fairly impressed with this range of choices, which may interest other Interface E owners and prospective purchasers.

H M Walker,
Stockport, Cheshire.

Air your opinions, share your experiences or just put out our occasional blunders. If you have an impressive way with words you may gain £10 for the star letter.

WRITE TO: Random Access,
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Lost in a maze of bits and bytes, trapped in a forest of errors, bugged by Basic? Whatever the problem, CALL on us. Our panel of experts is at your command.

Write to: Routine Inquiries, *Personal Computer News*, VNU, Evelyn House, 62 Oxford Street, London W1A 2HG.

Recording the hi-fi micro on cassette

Q Is there any way of recording the stereo sound the Amstrad produces onto cassette? For example, if someone creates a brilliant stereo soundtrack it would be annoying to have to use the computer every time you wanted to hear it.

Also, regarding commercial software, I have written two marketable programs, a machine code game and a utility. Would you recommend sending them to a software house, and probably having to wait a very long time before the money comes trickling in, or advertise myself in the back of a magazine?

James Eibsch,
Cheltenham, Glos.

A The Amstrad's designed to allow you to amplify its sound via a stereo system, so in order to record your latest concerto you'd just need the right cable. This would be wired up to take the Amstrad's sound output into the recording input on your stereo.

As for your other query, we'd strongly recommend that you work through a software house rather than striking out on your own. Certainly there's an immediate cash advantage to doing your own marketing and duplicating, and the mechanics of producing copies of computer programs are so simple that you can keep your overheads down, but what may seem to be an advantage can easily turn into a disadvantage.

Let's suppose you place your advertisement in the back of *PCN*. Let's further suppose you are inundated with replies, and no matter how fast you copy tapes, you can't keep up. And — dear oh dear — you seem to have cashed the cheques, and your aggrieved customers start writing letters to *PCN* complaining about you.

Alternatively, let's suppose you plan ahead, copy lots of tapes (borrowing from your bank or getting credit from a supplier) — and you get three replies. Your bank and credi-

tors start writing threatening letters and . . . you get the picture?

The point is that it's easy to advertise, but it's hard to plan at the low end of the market, and while some of the people you read about in the papers are out and out crooks, most of them are honest people who can't run a business, and have muffed their mail order.

Go for a software house — you might even sell more tapes.

Mysterious Spectrum malfunction

Q My Spectrum malfunctions occasionally. For no apparent reason, the keys refuse to print or do anything, and I have to switch off the computer and reload whatever I'm doing. It has happened often regardless of the location or whether I have the ZX Printer connected.

For instance, it happened when I was in someone else's house playing *Scrabble*, with nothing electrical or magnetic anywhere near it, and again when I was in the middle of running one of my own programs.

Gerard Cairney,
Stockbridge, Edinburgh.

A It is sometimes the case that a micro will hang up due to a sudden fluctuation in the voltage, but this happens less nowadays, as power supplies tend to be a bit more sophisticated. Under certain circumstances we do know of the Spectrum hanging up when a plug is pulled out from a nearby socket, but this is more a criticism of the wiring in question than of the Spectrum.

As your Spectrum is behaving like this in different houses, it's unlikely to be ropey wiring, so it sounds like something dodgy within the micro. Equally, since the effect is present on both commercial programs and your own it can't be some bomb you've inadvertently planted in your programs.

It could be some sort of minute interruption or fluctuation of the power supply, too small to reset the machine. This could be inside the Spectrum, or could even be a loose connection in your power supply unit. Check it with a different power supply, and report to your dealer.

Take a Memo, take a Break

Q I recently bought a Memo-tech MTX512 computer. I locked the numeric pad by having a statement at the start of my program, eg
10 POKE 64145,132
20 POKE 64862,13
30 PRINT INKEYS
40

As I miskeyed a number while entering DATA, I wanted to break the program to start again, but the break key is also locked.

Secondly, I don't have a PRINT USING command, so I express the results of my calculations as INT(N¹⁰⁰)/100 for two decimal places. This is alright but the results aren't lined up properly.

Manuel Rosario,
Jeddah, Saudi Arabia.

A We assume that you wish to reactivate the Break key while the program is running.

To do this you must have some way of POKEing 64862 to set the Break bit. However, unless you include this in your program, you will only stop the program by a system reset. The following routine should satisfy your requirements.

10 POKE 64862,13 ; disable

Getting Oric curves straight

Q I cannot work out how to get my Oric to draw semicircles and curves.

Gary Whitaker,
Leitchworth, Herts.

A The routine below draws a circle, starting at 3 o'clock. To have it draw a semicircle, change the lower limit of the FOR loop to 180, the curve will be drawn from 9 o'clock to 3

o'clock. You should be able to modify the routine to draw a semicircle from any point on a circle to any other point by changing the lower and upper limits of the loop.

You can alter the radius to any value which won't make the Oric try to draw part of the circle off the screen, and you can get some interesting curves by altering the value of the radius within the loop. The STEP size can also be changed for different effects.

20 LET X\$ = INKEY\$
30 IF X\$ = CHR\$(128) THEN POKE 64862,15 : LET X\$ = ""
40 PRINT X\$
50 PAUSE 80 ; keyboard
debounce

60 GOTO 20
Line 30 checks to see if Function Key F1 has been pressed. This is the signal that you wish to reenable the break key.

Unfortunately, the MTX does not support PRINT USING, but it should not be difficult to write a small machine code section to handle this.

Popular Pascal

Q Are there any versions of the programming language Pascal for the Spectrum or Dragon 32?

Peter Fleming,
Chorleywood, Herts.

A There are only two contenders: Hisoft Pascal for the Spectrum (reviewed *PCN*, issue 4) and Petite Pascal for the Dragon, from Oasis Software. Of the two, Hisoft's is far and away the better.

Hisoft is on 079326616, while Oasis can be contacted on 0934 515265.

```

10 REM Set screen center (origin)
20 CLS:OY=100:OX=120:RADIUS=20
30 CURSET OX,OY,0
40 FOR DEGREE=0 TO 360 STEP 1
50 REM convert degrees to radians
60 R=DEGREE * (PI/180)
70 REM Calculate X on circumference
80 CX=OX + RADIUS * COS(R)
90 REM Calculate Y on circumference
100 CY=OY + RADIUS * SIN(R)
110 REM Set point
120 CURSET CX,CY,1
130 NEXT DEGREE

```

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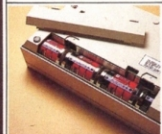
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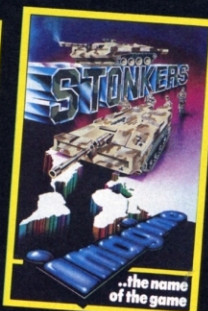
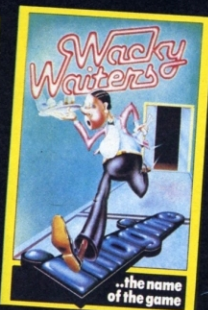
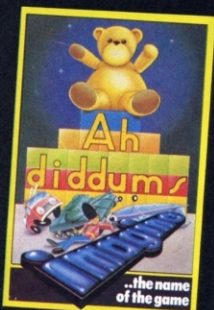
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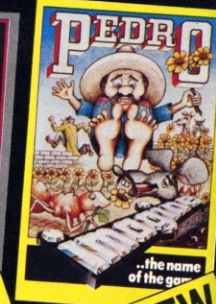
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Send your contributions to: *Microwaves*, PCN, 62 Oxford Street, London W1A 2HG.

Adam's strange I/O error

We have recently purchased a Coleco Adam computer system and would like to offer the first tip for the system. It appears that the Adam reads the data pack directory into a buffer in memory and then checks to see whether the data pack has been changed.

However, sometimes the Adam fails to recognise that the data pack has been changed and gives an I/O error whenever the data drive is accessed.

If you get an error when trying to load data which you know is on the tape, simply open and close the data drive door.

I hope this information is of interest to Adam owners and users.

David Winnett
Chairman, Towcester Micro-computer User's Group,
Northamptonshire.

Sounding out Beeb keyboard

Here are a few hints to try out for anyone with a BBC micro. Trying typing `?&FE40=0` to produce a very interesting sounding keyboard. Typing in `?&FE45=n` will speed up or slow down any program, where `n` is a number between 0 and 20.

Also a single key program saver is:

```
*KEY0.SAVES(PAGE+6):M
```

This requires the first line of the program to contain `10 REM (name)` and the function key will save the program as 'name'.

Paul Vickers
Whitchurch, Bristol.

Thermal paper comes on stream

Alphacomp printer owners may be interested to know that Dean Electronics, the importers of Alphacomp printers, can supply direct, thermal paper to give red or black on white in addition to the normal blue on white (See *Microwaves*, Issue 63).

Dean Electronics can be reached on 0344 885661.

Bob Croker
Huntingdon, Cambs.

Note the timbre on Spectrum

With reference to Andy Goodsell's program to improve the Spectrum BEEP command (*Microwaves*, Issue 63), here is another simple Basic program which explores the variation in timbre between the notes in the BEEP range.

```
10 FOR I=-40 TO 30 STEP 0.2
20 BEEP 0.05, INT(RND*I)
30 NEXT I
40 GOTO 10
```

Micheal Downing,
Great Barr, Birmingham.

How to reset Oric without tears

I often have to reset the Oric's character set by pressing the reset button on the bottom of the machine.

Recently, though, I have found a useful call, `CALL#F89B`, which resets the characters without affecting the program in any way.

This could be very useful if you wished to have a reset within a program.

D Thomas
Mid-Glamorgan, South Wales.

Cursor stays put while you print controls

The routine here for the Commodore 64 allows the cursor characters to be added to a string during a GET loop. This has the effect of printing the cursor control characters rather than actually moving the cursor.

This can be demonstrated by entering: `E(cursor down)E(cursor down)E(reverse on) (control back)EE(reverse off)(cursor up)E(cursor up)E`, then hit the F1 key.

POKE 212,1 puts you into quote mode so that characters are printed to the screen as if preceded by a quote when writing a Basic program line.

```
10 PB="": PRINT"[CLS]"
20 PRINT "ENTER STRING NOW - PRESS
F1 TO PRINT STRING"
30 POKE 212,1:GET A$; IF A$="" THEN 30
40 IF ASC(CHR$(13)) THEN 80
50 PB=PB+A$
60 PRINT A$
70 GOTO 30
80 POKE212,0:PRINT "[3$CURSOR DOWN]"
90 PRINT PB
100 POKE 214,15:PRINT"[CURSOR DOWN]"
```

PJ Haynes, Crawley, Sussex.

Blowing up your characters

A high-resolution explosion can be generated at any character position on the 16K/48K Spectrum's screen, using the program below. S=row, T=column and W\$=character to be blown up.

You can alter the size of the explosion by adjusting the value of B in the FOR-NEXT loop at line 230 and at lines 290 and 380.

M Hawkins,
Ramsgate, Kent

```
100 PAPER 0
110 BORDER 0
120 CLS
130 INPUT "ROW ? (0 TO 21)";S
140 INPUT "COLUMN ? (0 TO 31)";T
150 PRINT INK 6;AT S,T;"G"
160 LET W$="G"
170 OVER 1
180 BRIGHT 1
190 LET X=0+T*B+4
200 LET Y=175-S*B-4
210 FOR A=1 TO 2
220 IF A=2 THEN PRINT AT S,T;W$
230 FOR B=0 TO 29 STEP 2
240 LET C=B*(X+B<256)
250 LET D=B*(Y+B<176)
260 LET E=B*(X-B)-1
270 LET F=B*(Y-B)-1
280 INK 2:INT (RND*6)
290 IF B>14 THEN GO TO 380
300 PLOT X+C/2,Y+D
310 PLOT X-E/2,Y-F
320 PLOT X+C/2,Y-F
330 PLOT X-E/2,Y+D
340 PLOT X+C,Y+D/2
350 PLOT X-E,Y-F/2
360 PLOT X+C,Y-F/2
370 PLOT X-E,Y+D/2
380 IF B>15 THEN GO TO 430
390 PLOT X+C-1,Y+D-1
400 PLOT X-E+1,Y-F+1
410 PLOT X+C-1,Y-F+1
420 PLOT X-E+1,Y+D-1
430 PLOT X,Y+D
440 PLOT X+C,Y
450 PLOT X,Y-F
460 PLOT X-E,Y
470 NEXT B
480 NEXT A
490 BRIGHT 0
500 OVER 0
```


Climbing every mountain just for the fun of it is the spirit of this club, as Wendie Pearson discovered.

Turning turtle in Bedford

The countdown has begun for Bedford Computer Club's BBC turtle project. The blueprint stage is over, the parts have been collected together, and members will start building at the next meeting.

'The challenge of building a turtle is like climbing a mountain — because it's there,' said organiser Mr Thompson. 'We want to get an idea of controlling something outside the computer, and it will improve the club's expertise.'

The turtle will cost the club only about £20, as many pieces have been donated by members, including a pair of stepper motors, and a raided Meccano set. The next step will be to write software, and attach sensors, bumpers and a bar code reader so the turtle can find its way through a maze on the floor.

The five year old club meets on the first and third Monday of each month, at the Star Club. Contact Janet Thompson, 0767 82365.



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REVIEWING COMPETITION: It could change your life

Simon Taylor comes up with a Centronics printer driver from Commodore's CP/M cartridge.

Demon driver program

Commodore's CP/M cartridge for the 64 is a welcome addition, but one serious omission is that it doesn't make the use of Epson or other Centronics printers any easier.

Many interfaces, both hardware and software, are available for the 64 in its normal mode. The Mikrogen interface I use is typical, and allows printing of the cursor control characters in listings on any Epson printer. But the CP/M cartridge allows you to use only the Vic range of printers and the 4022, a parallel IEEE printer.

So when I purchased my CP/M cartridge

I was faced with the option of buying a Vic printer (sobering thought) or making my Centronics printer work again. The solution looks complicated, but is in fact simple to anyone with a reasonable knowledge of CP/M.

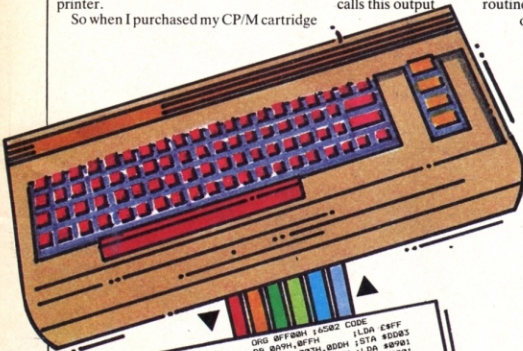
The CBM 64 CP/M cartridge uses the Z80 processor for normal CP/M operations and the 6510 processor already in the 64 for all its I/O. I've picked on a standard 6502 routine to handle the actual output to the printer and relevant control signals, while an interface routine running under the Z80 calls this output routine. This type of procedure is explained in the

CP/M manual. Enter the Assembly program using ED and assemble as normal.

You will notice that the 6510 code is also incorporated in the assembler as DB directives. Once you've assembled the program your .HEX file will be ready for use.

Whenever you load CP/M you will need to either execute the SUBMIT file given or manually load the code using DDT.

After all of this, when you type CONTROL-P, the printer will be switched on and off as in normal CP/M. All of the programs, ED, DDT and the assembler ASM will be on your CP/M utilities disk. **PCW**



```

ORG $F000H ;$002 CODE
FF00 A9FF DB $00H,$07FH ;LDA $0003
FF02 50E3DD DB $00H,$0E3H,$00H ;STA $0003
FF03 80E187 DB $00H,$0E1H,$00H ;STA $0003
FF05 80E1DD DB $00H,$0E1H,$00H ;LDA $0000
FF06 80B0DD DB $00H ;LAX
FF0E AA DB $27H,$0F8H ;LDD $0000
FF10 80B0DD DB $00H,$00H,$00H ;LDA $0000
FF14 A0B0DD DB $00H,$00H,$00H ;LDD $0000
FF17 2918 DB $C9H,$18H ;LDD $0000
FF19 C918 DB $C9H,$18H ;LDD $0000
FF1B D0F7 DB $00H,$07FH ;LAX
FF1E 80B0DD DB $00H,$00H,$00H ;STA $0000
FF21 68 DB $00H ;RTS
;START OF Z80 CODE
;START EQU $A000H
;D0518 EQU $ACB1H
LIST EQU $ACB1H
LIST EQU $ACB1H
;LIST EQU $00H ;CODE FOR $518 JUMP
SPACE
;ORG LIST
MOV A,C ;MOVE DATA INTO A
STA $F010H ;PUT INTO DATA REG
MVI A,$02 ;JUMP TO $0F00 IN $518
JMP ;D0518
;
;ORG LIST$1 ;PRINTER ALWAYS READY
;
ACB1 ACB1 30B1 ;RET
ACB3 C9
    
```

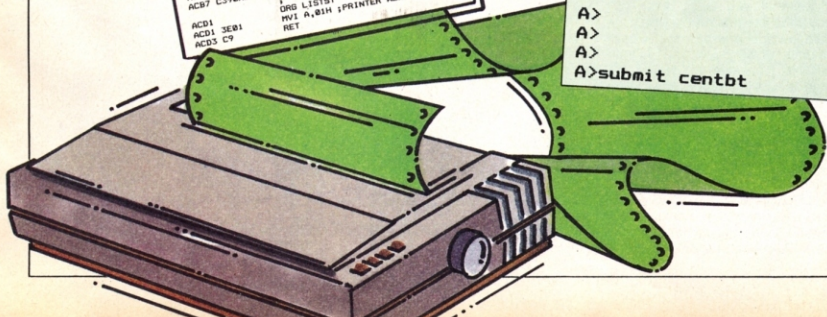
Below is a screen dump showing the steps you go through to get your driver program to work. Just make sure you get this on screen and you can't go wrong.

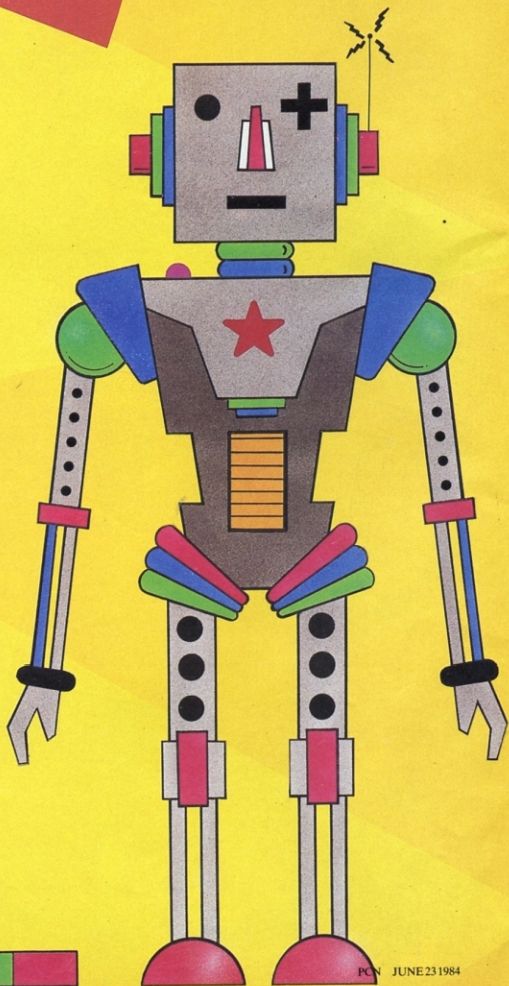
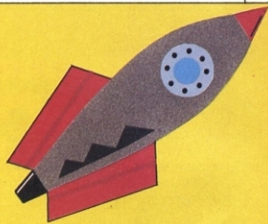
```

asm
A>
A>asm cent
CP/M ASSEMBLER - VER 2.0
ACD4
000H USE FACTOR
END OF ASSEMBLY

A>
A>
A>dtd
A>
A>ddt cent.hex
DDT VERS 2.2
NEXT PC
FF22 0000
~^C
A>
A>
A>type centbt.sub
XSUB
DDT
ICENT.HEX
R
G0000

A>
A>
A>
A>submit centbt
    
```





HOW THE PROGRAM WORKS

Every fiftieth of a second the computer stops what it's doing to execute an interrupt routine — such as to update the screen and keyboard. This routine is found at &H9030 in ROM, but the pointer to this address is in RAM at &H0100 and therefore can be altered to any address you wish. After you execute the interrupt routine you have written you must jump back to &H9030 or the computer will crash. My program uses this technique to update the sprites at each interrupt — this routine is found at &H7A00. The eight extra commands are installed by changing the despatch address of the function MEM. This is done by copying the tables and addresses into RAM and altering the pointer. The MEM word is replaced with a % sign so that when a % sign is encountered in a program the computer jumps to our own despatch table. MEM is now referred to as %MEM.

Dragon graphics get more puff with Andrew Richards' programs.

Dragon in motion

The programs here could be a sprite for sore eyes for Dragon owners. The machine code sprite generator will produce up to 33 sprites, and also provides eight extra commands to define and control them.

The sprites are interrupt dependent and there are eight frames per sprite, so you can animate them. You can have eagles flapping their wings, space invaders jumping up and down or figures walking — the possibilities are endless.

The sprites are functional on PMODE4 or PMODE3 screens. Dragon Data's own attempt at sprites (definable graphic blocks) uses the GET and PUT statements. These are useful if you have only one on screen at a time, and if it's not too large, but the advantage the system here has is that the size of the block is variable. My sprites, however, must be 24 bits long horizontally and from eight to 24 bits deep vertically to help with speed. The program itself slows down the Basic operation by only 1/50th of a second.

When I set out with this program I was updating all 33 sprites on each interrupt. This drastically slowed down the Basic, so I adopted the method of updating each sprite one after another with number one sprite after interrupt and then number two sprite after interrupt, and so on . . . The more sprites you use the slower each one becomes — a small price to pay.

Supersprite

This too became unsatisfactory once I realised that if you had only one sprite which is always updated at the interrupt, this would allow you to write a 'space invader' game quite easily in Basic.

So the Supersprite was created. This is always sprite number 0. Another problem which had to be overcome was a shortage of memory as each sprite used up so much. The solution I chose was to allow only five differently definable sprites and have clones to make up the others. These are, as the name implies, copies of previously-defined sprites, and take up only 14 bytes each. Once defined as a sprite they act as a sprite and are controlled by the same commands.

There are eight new commands, each of which is preceded by a % to distinguish it. All of the new commands are syntax checked and will report errors if there are any. Let's take a look at each command separately, starting with the %CREATE command, which has 19 parameters.

As the name suggests this command is used to define the sprites. Its argument is: $x = \%CREATE(N)(H)(F)(X)(Y)(X)(Y)(Y) \dots$ where n refers to the number of the sprite being defined, its value being in the range of 0 to 4. As you can see all the differently-designed sprites must be de-

fined before cloning; h is the vertical bit position to start defining eight lines from, its value being from 0 to 16. So by overlapping create commands you can define the vertical height from 8 to 24.

The frame definer is f. With a value from 0 to 7 it will define only that specific frame with that design, or with a value of 8 it will define all the frames as the same so that you have an unanimated sprite.

There are eight Xs and Ys to define eight lines of the graphic block at one time. So you would need three CREATE commands to create a sprite of 24×24 . The Xs are 8-bit numbers (0 to 255) and the Ys are 16-bit numbers (hence 24 bits) with values from 0 to 65535. So one x and y will make one line. Unfortunately there is no easy way of defining graphics blocks, so you'll have to work out the bit patterns. But the Sprite Definer program will help here.

Clones

When defining your sprite bear in mind that you must have a space at the edges so that you don't leave a trail.

After defining the sprites the next step is to CLONE them. The argument is $x = \%CLONE(P)(N)$, where p is a previously defined sprite or a previously defined clone and n is the value of the new sprite being defined.

Do not define a sprite that has already been defined or define a sprite whose value is greater than 32.

Next we want to be able to use them. The first of the controlling commands is the %SPRITE command. Its argument is:

$x = \%SPRITE(N)(O)(X)(Y)(B)$

Here n is the number of the sprite being used; o is an on/off flag; 0 turns the sprite off, and 1 turns the sprite on; x is the horizontal position on the screen, in the range of 0 to 230; y is the vertical position on the screen in the range of 0 to (191-height of sprite) and b is a flag for stopping or bouncing the sprite off the edges of the screen, if it hits the edge. If b is set to 1 then when a sprite hits an edge it will bounce off it and continue moving in the opposite direction. The sprite can be moved using this command by changing the x and y values, but it is much jerkier than using the %MOVE command which uses the interrupt.

So to turn our sprite on, we use this line:

$20 x = \%SPRITE(0)(1)(0)(0)(1)$

To see it on the high-resolution screen add:

$PMODE4,1:SCREEN,0:PCLS$
 $100 GOTO 100$

The argument for %MOVE is:

$x = \%MOVE(N)(DX)(DY)$

Features of these programs include a hex dump of the sprite generator; disassembled listing of the sprite generator routines for machine code buffs; a machine code loader program; the game Falling Drones, which will be published in a future issue, and a sprite definer program.

Entering the programs:

First type CLEAR 5840,26927 to reserve the required amount of memory for the sprite generator. Now type in the machine code loader program and RUN it. Enter each line of the hex dump pressing 'ENTER' after each line. Once you have completed all the numbers save this on tape by typing CSAVEM'SPRITES', &HTA00,&H7FFF,&HTA00. Now for the moment of truth! Type EXEC&H7A0B to install the sprite generator. This, if the numbers have been typed in correctly, should give an instant response. All the extra commands are now implemented.

The sprite definer program allows you to draw your own designs for sprites on the screen and then display the number equivalent. The cursor is moved with the arrow keys and the space-bar turns the trail delete on or off. Once you've finished drawing your sprites press the 'ENTER' key. After a short wait the list of numbers will be displayed in three groups of 16 (the number needed for a CREATE command). The definer is for use with PMODE4 screens only. You'll have to write your own one for PMODE3 screens!

20 ▶

```

10 REM MACHINE CODE LOADER PROG
20 I=%H7A00
30 INPUTA#
40 FOR J=1 TO LEN(A#) STEP 2
50 POKE I,VAL("&H"+MID$(A#,J,2))
60 I=I+1
70 NEXT J
80 IF I>%H7FFF THEN END ELSE 30
    
```

```

7A00 B08E831F10F17C7C10220446
7A0C F77C7A860E3DC378301F02EC
7A18 214FFD7C70EC234FFD7C72E6
7A24 25FD7C74B67C7CB77FFC60E
7A30 3DC378301F026DA4274CEC21
7A3C 4FFD7C76EC234FFD7C78FC7C
7A48 7083001810B37C762E34FC7C
7A54 70C3001810B37C762D28FC7C
7A60 72B37C7410B37C782E1CFC7C
7A6C 72F37C7410B37C782D10B67F
7A78 FFB17C7A27081F891212127E
7A84 8C36B67FF27077A77FF3132
7A90 20A4C6FF4FDD527E9C3E863F
7A9C B7A723BD8E839F8D108E88B8
7AA8 A6A0B7FF20108CBB80230220
7AB4 EF9E8D26EF8637B7FF235F7E
    
```

DRAGON GRAPHICS

Here n is the number of the sprite to be moved, and dx is the direction in the X axis. This uses two's complement form numbers, so bit 7 is a negative (-128). To move the sprite right by one pixel at a time then dx would hold the value 1. If you want the sprite to move left by one pixel at a time then dx would hold the value 255 (256-value of move, in this case 1). Remember that dx is in the range of -8 to 8, as past this the object is too jerky.

The direction of the y axis is dy. This works as the dx value and has the same restrictions.

The nice thing about the %MOVE command is that once set the sprite will continue moving in the direction specified on its own until it reaches the edges of the screen, where it will either bounce off or remain. As the sprites are interrupt driven they are extremely smooth and only flicker slightly when they move over one another.

Add this line to your program:

```
30 X=%MOVE(0) (1) (1)
```

Now that we are able to define and move a sprite we want some commands to check its position on the screen and whether any collisions with another sprite have taken

place. For this we have three commands, %XVAL, %YVAL and %COLL.

The argument for %XVAL is X=%XVAL(n). Here n is the number of the sprite to be tested. %XVAL stands for the value of the x axis of the sprite n.

Similarly %YVAL(n) checks the value in the y axis of the sprite n. These can be used to detect whether the sprite has reached the boundaries. Obviously having the value 0 in %XVAL and %YVAL means that the sprite is either at the top left-hand corner of the screen, or at the moment of testing bounced off the top left-hand

```
7AC0 8C36BD8E831F10F17C7C1022
7ACC 0384860E3DC378301F02E624
7AD8 7E8C368E0400CC6060ED818C
7AE4 05FE23F9C6408E7F8BA680B0
7AF0 8CAB5A26F87E7BE18E0400CD
7AFC 202012123476860EB77C7DF6
7B08 7C7B102700B13DC378301F02
7B14 6DA4102700A58E0000EC213A
7B20 30861F104F8C00002C05CCFF
7B2C 0020088C00E62F09CC01E66D
7B38 2B27026021E722A72C8E0000
7B44 EC233A30861F104F8C00002C
7B50 05CCFF002008AC292F0AE62A
7B5C 86016D2B27026023E724A72D
7B68 86203DC306001F01A6225F82
7B74 0825035C20F94339E6283DE3
7B80 261F03E6257D7C7E27143404
7B8C ECC1ED81ECC1ED8130881C35
7B98 045A2AE2021318918003404
7BA4 ECC1AA0EA00ED81ECC1AA00
7BB0 EAA0ED8130881C31A81C3504
7BBC 5A2AE37D7C7D207A7F7C7D10
7BC8 8E78307E7B14867E7B27094F
7BD4 2603B67C7CB77C7B35767E9D
7BE0 3D8E7B00BF010D8E69304FA7
7BEC 808C79FF23F97E7C600121212
7BF8 121212121212121228E7EC3BF
7C04 0126108E81CA86A0A780108C
7C10 822C23F686A5A780108E8230
7C1C A6A0A780108C829323F68E7F
7C28 47BF0128108E7C3510AF8836
7C34 398E7E5B5F109E6A6A4A184
7C40 2620A68081802406A10A2616
7C4C 20F4847FA1A0260C109FA658
7C58 8E7EA33AAE846E84301FA680
7C64 818025FA5CC10A25CC7E8B8D
7C70 00C1008F0001700C1008F0000
7C7C 000000BD8E831F10C1052505
7C88 C0887E8344F77C7CF77C7B86
7C94 0E3DC378301F021F10F77C78
7CA0 5FC303087A7C7826F8C36930
7CAC ED26BD8E831F10F77C74CB07
7CB8 E725C660E7286F2986BFA025
7CC4 A72ABD8E831F10C1082D5FE6
7CD0 25A628DF0C78108E26F67C74
```

```
7CDE 86043D31A510BF7C76BD8E83
7CE8 BF7C70BD8E83BF7C72FC7C78
7CF4 C6083406FC7C70EDA4FC7C72
7D00 ED22787C73797C7279C7179
7D0C 7C70350631A65A26E110BE7C
7D18 76312410BF7C76F67C795AF7
7D24 7C79F17C742CBA7E7E57F77C
7D30 7AA6283DBD7FDC12A6251F12
7D3C 3402BD8E83BF7C70BD8E83BF
7D48 7C72F67C7A27133404787C73
7D54 797C7279C7179C7035045A
7D60 26EDFC7C70EDA1FC7C72EDA1
7D6C 35024AB17C742CC87E7E57BD
7D78 8E831F10F17C7C102200CF86
7D84 0E3DC378301F02BD8E831F10
7D90 E721BD8E831F10E7237E7E57
7D9C BD8E831F10F17C7C102200AA
7DA8 860E3DC378301F02BD8E831F
7DB4 10E7A4BD8E831F10108300E6
7DC0 102E008EE722BD8E831F1010
7DC4 A329102E0080E724BD8E831F
7DD8 10C401E72B7E7E57BD8E831F
7DE4 10F17C7C10220066860E3DC3
7DF0 78341F02BD8E831F10C12010
7DFC 220053F77C7CF77C7B860E3D
7E08 C378341F0106EAA6A0A7805A
7E14 26F97E7E57BD8E831F10C401
7E20 F77C7EBD8E831F10C11F1022
7E2C 0024F77C7CF77C7B7E7E57BD
7E38 8E831F10F17C7C2211860E3D
7E44 C378301F02E6227E8C361212
7E50 1212C6087E83445F7E8C3643
7E5C 52454154C5404F56C5535052
7E68 4954C5434C4F4EC5434E54CC
7E74 585641CC595641CC434F4CCC
7E80 57484954C54D45CD4545C44E
7E8C 4F4953C5465245C5545241D0
7E98 4552D24552CC4D455247C57C
7EA4 7F7D77D9C7DE07E197E377A
7EB0 C27A007A9A8C317DA68C317D
7EB8 CD7D0B7DE17DE95347CE494E
7EC8 D44142D3504FD3524EC45351
7ED4 D24C4FC74558D05349CE434F
7EE0 D35441CE4154CE504545CB4C
7EE8 45CE535452A45641CC4153C3
```

DRAGON GRAPHICS

corner of the screen.

The last of checking commands and the most important is the %COLL command, which tests for collisions with other sprites.

In $X = \%COLL(n)$, n is the number of the sprite being tested. The value returned will be 255 if no collision is taking place, or the value of the sprite that has collided with the sprite being tested. So if we test sprite number 2 by $A = \%COLL(2)$ and sprite number 4 collides with it, the value of A

will be 4. If two or more sprites collide with a sprite the priority goes to the one with the lower number.

This just leaves one sprite command — %CNTL. In $X = \%CNTL(b)(n)$, n defines the number of sprites to be updated. This is useful, say, in a space invaders game where you want to speed up the remaining invaders as they are destroyed. Just turning them off by the SPRITE command does not work, and b is a flag which is used

to turn on (0) or turn off (1) the background display. This uses pages 5-8 as the background. If you draw the background on both high-resolution screens and switch on the background then your sprites will not erase it as they pass over.

Another command in the program is $X = \%WHITE(d)$.

It gives you a white noise facility, where d is the duration of the noise in fiftieths of seconds.

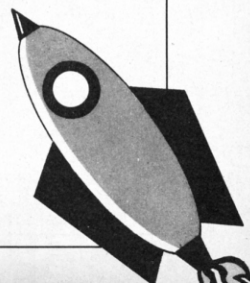
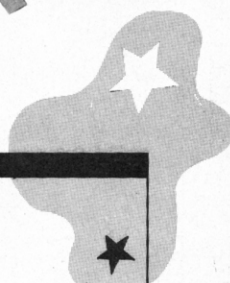
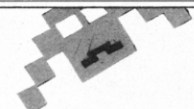
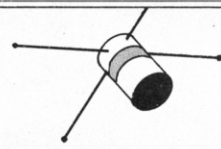
PCN

```
7EF8 434852A4454FC64A4F595354
7F04 CB4649D8484558A44C454654
7F10 A45249474854A44D4944A450
7F1C 4F494ED4494E4B4559A4A556
7F28 41525054D2494E5354D25449
7F34 4D45D250504F494ED4535452
7F40 494E47A45553D29425949994
7F4C 3E9ADE97729697923C971397
7F58 D197CB981698778E968DC78C
7F64 408E5C8D0E68DD2B800B80D99
7F70 56A00E8DF18E0E8E15BA44B7
7F7C 967C359AF49BB49D59A6C798
```

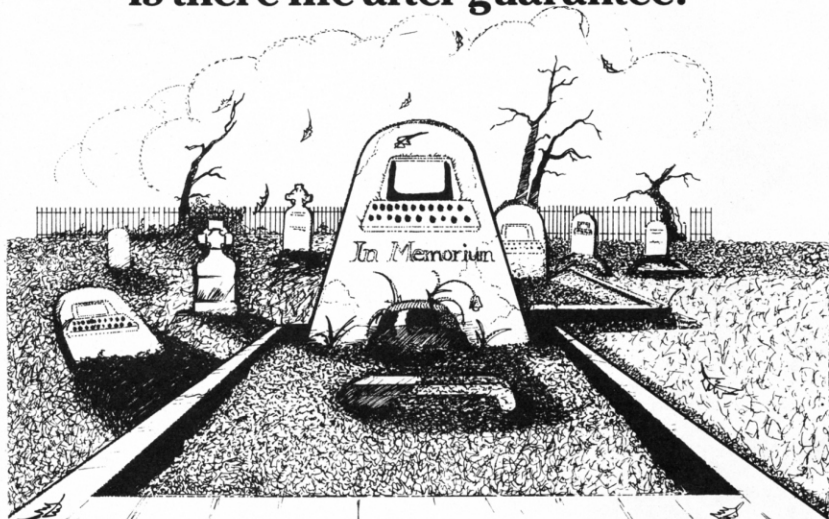
```
7F88 849D1D20202020445241474F
7F94 4E205350524954452047454E
7FA0 455241544F52202020202020
7FAC 202020284329203139383320
7FB8 20412E4D2E52494348415244
7FC4 53202020202020201F10E3261F
7FD0 018604F67C743D3085391212
7FDC 121212121212121212121212
7FE8 121212121212121212121212
7FF4 121212121212121212121212
8000 7EBB40 JMP $BB40
```

Sprite Definer program

```
10 REM SPRITE DEFINER
20 REM FOR PMODE4 SCREENS
30 REM (C)1983 ANDREW RICHARDS
40 CLS
50 FOR I=1 TO 26 : SET(X1,I,3) : SET(X2,I,3) : SET(X3,I,3) : SET(X4,I,26,3) : NEXT I
60 PRINT@112, "USE ARROW KEYS"
70 PRINT@144, "TO MOVE CURSOR."
80 PRINT@176, "PRESS SPACE-BAR"
90 PRINT@208, "TO CHANGE MODE."
100 PRINT@240, "PRESS ENTER WHEN"
110 PRINT@272, "READY."
120 PRINT@16, "X POSITION:"
130 PRINT@48, "Y POSITION:"
140 X1=2 : Y1=2 : C=2 : B=0
150 IF C=2 THEN SET(X1,Y1,C) : FOR W=1 TO 20 : NEXT W : RESET(X1,Y1) ELSE RESET(X1,Y1) : FOR W=1 TO 20 : NEXT W : SET(X1,Y1,B)
160 X1=X1+C-1 : Y1=Y1-1 AND PEEK(343)=223-(X1+1<26 AND PEEK(344)=223)
170 Y1=Y1+C-1 AND PEEK(341)=223-(Y1+1<26 AND PEEK(342)=223)
180 PRINT@27, X1-1 : PRINT@59, Y1-1
190 IF PEEK(135)=32 THEN H=C : C=B : B=H : POKE135,0 : SOUND1,1
200 IF PEEK(135)=13 THEN 220
210 GOTO 150
220 PMODE4,1 : PCLS
230 FOR J=2 TO 25
240 FOR I=2 TO 25
250 IF POINT(I,J)<>0 THEN PSET(I-2,J-2)
260 NEXT J
270 CLS : PRINT "SPRITE PATTERN"
280 X=#H600
290 FOR I=1 TO 24
300 PRINT PEEK(X) : PEEK(X+1) * 256 + PEEK(X+2)
310 IF I/8=INT(I/8) THEN PRINT
320 X=X+32 : NEXT I
```



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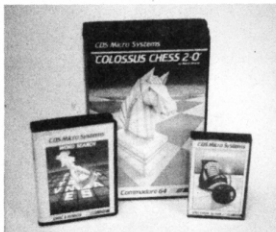
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3 What display chip does the Amstrad use?

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The Indus GT disk system for Atari computers is capable of running any of the Atari format disks. Some of its features, such as double density and bundled software, could make it attractive to Atari owners.

Presentation

The GT comes in a tough black plastic carrying case along with power supply, system disks and manuals. The case divider allows the case to be used as a disk store of well over a hundred disks. The system disks contain some bundled software, consisting of the GT database manager, the GT Albert E spreadsheet, and the Estate word processor.

Getting going is easy — just plug in the power supply and connect the drive to the Atari via the standard lead. Switch on the disk drive and insert the disk, then switch on the computer and away you go. The machine boots up to the DOS XL, version 2.2, menu giving all the standard options on the Atari system, such as backup, load, save and rename.

The drive itself is rather good-looking. It has a matt black case and a semi-transparent clipdown cover at the front which, apart from protecting the front panel, makes the drive look very neat and tidy when shut. On this front panel are four switches, three LEDs and two seven-segment LED displays.

The three status LEDs show whether

power is on, the drive is busy, or the disk is write-protected. As for the four buttons, they allow a number of status codes to be displayed. The Protect button enables the disk to be write-protected without having to place a sticky cover over the normal write-protect slot on the disk. The Drive Type button causes the LED display to show which of three drives is running — the Atari 810/1050 single density, the 815 double density, or the 1050 double density.

The type of drive is normally set up automatically by the DOS but it can be altered by pressing the Drive Type and Track buttons together, giving you the last word in the matter.

The Track button on its own enables the seven-segment display to show the current track being accessed. This can be quite interesting as disk accesses can actually be seen taking place. The last button, the Error button, makes the seven segment display show the last error number that occurred.

The front panel is more comprehensive than is usual for any disk drive and should prove to be quite entertaining.

Software

One selling point of the GT is its bundled software of word processor, spreadsheet and database. Each of these comes on its own disk and has its own manual. All are executed via the autoboot system for which you switch off the Atari, insert the disk,

then switch on the computer again. They all take between 10 and 15 seconds to load, and then it's manual-reading time since they are not particularly friendly packages.

The wordprocessor works on a 35 column screen, in black and white. The line can be almost any length as it does not wrap around the screen as do most word-processors. This has the drawback that the carriage return needs to be pressed at the end of each line and, when the centre of the screen is reached, the whole screen scrolls across as the line gets longer.

The display, at the top of the screen, shows the status of the editor. Such details as the total number of characters, the amount of memory left, the number of characters that can be typed in before the memory is full, and the column position of the cursor, are displayed and updated constantly. There is also an error message flag at top right.

The screen splits into two parts — editing and command line, which is used to tell the word processor to load, save text, and so on. It does appear to be case-sensitive — most commands need to be in upper case otherwise an error is generated.

Also included with the word processor is a printer format routine to allow documents to be produced with indents, margins, justification and so on, on the printer.

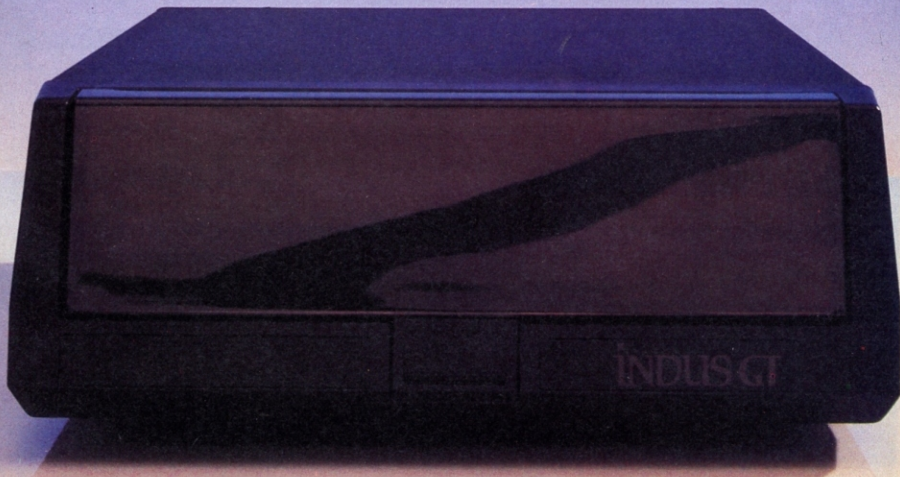
Overall, the word processor is very similar to Easiscrypt as used on the

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Commodore 64.

The simple database is perhaps the easiest to use of all the packages. It comes with some example files, a list of Sci-Fi books and some telephone numbers, which can be used for practice. The menu-driven system allows files to be sorted, searched, printed, and displayed. Setting up a database is simply a matter of following the instructions on the screen and in most cases, a quick read of the manual suffices.

The calculator is a little harder to use, and at times a little slow. Entering the data is not done in the usual way by moving a cursor around the screen. Instead, each cell has to be specified by its coordinates before anything can be placed into it. It also takes an awfully long time over its recalculations, but fortunately does not redo them every time something is changed.

Documentation

The manuals with the Indus GT are all about the size of a 5/4in disk. Coupled with the lack of an index, this makes them a little hard to read.

The DOS XL Operator's Guide contains more or less everything you need to know about using the system and, though a little chatty and Americanised in places, it's quite readable. All of the DOS functions are covered, including how to transfer data from single density to double density disks. The manual also shows how to use the Basic commands with the drive. Such things as ENTERLIST and OPEN, PUT and GET are covered, but not in any great detail.

The separate manuals for each of the software packages are the same small size as the Operator's Guide and have the same drawbacks, but they are pretty easy to follow. Command summaries will help

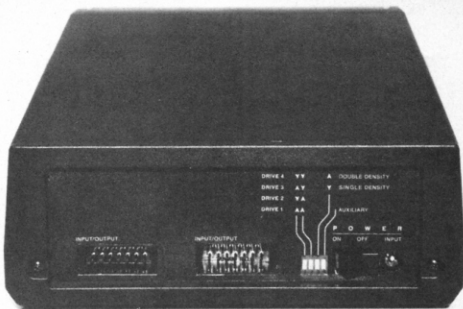
The Indus GT uses the standard Atari connectors and allows up to four drives to be used at once. The drive number is selected by altering the two lefthand dip switch settings.

those users who hate ploughing all the way through a manual just to be able to operate the system a little. The wordprocessor booklet comes with a nice handy reference card showing all the major commands and how to use them.

In Use

All of the software packages work well with no errors. The menu-driven DOS system is very nice and makes the system easy to use. From Basic, the file handling was fairly good and quite fast. The PUT and GET statements being faster than PRINT and INPUT, it takes about 34 seconds to PUT 1000 records into a file and 50 seconds or so to PRINT them. The demonstration program shows a method of checking for errors but there weren't any.

The smoked plastic cover protects the drive controls and readouts. The two seven-segment displays on the left are used to display error messages, drive type, and the current track.



Verdict

Since the Indus GT can cope with all of the Atari disk formats, it would be quite a good buy for an upgrade or the first time user. It is a little more expensive than the Atari drives but considering the bundled software and the multiple format capability, it is a very nice disk system.

Demonstration program

```

10 DIMA(500)
20 FORT=0 TO 500
30 A(T)=INT(RND(1)*10)
40 NEXT T
50 OPEN #1,8,0,"D1:TEST"
60 FORT=0 TO 500
70 PUT #1,A(T)
80 NEXT T
90 CLOSE #1
100 OPEN #1,4,0,"D1:TEST"
110 FORT=0 TO 500
120 GET #1,X
130 IF A(T)<>X THEN PRINT "READERROR"
140 NEXT T
150 CLOSE #1
    
```

Command summary

Catalogue files on disk	Protect files
Jump to cartridge	Unprotect files
Copy files	Rename files
Duplicate disk	Save binary file
Erase files	Load binary file
Initialise disk	Go to address
Extended command	RS232fix
Configure drive densities	

Basic command summary

CLOSE a file	ENTER a listed file
GET a single byte	INPUT data
LIST a program	LOAD a program
OPEN a file	PRINT to a file
PUT a single byte	SAVE a file
X10 extended I/O command	includes
Rename Protect Unprotect	

Product Indus GT Disk Drive **Price** £395
Distributor Hi Tech, 212-213 Broad Street,
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System Atari



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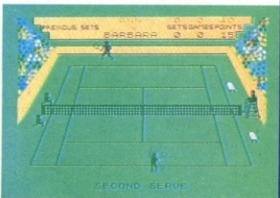
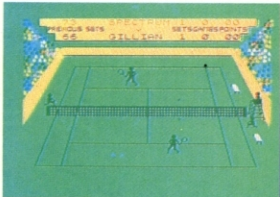
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Sinclair Research Ltd, Camberley (0276) 685311.

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sinclair



Advance storage: 360K floppy disk drives, with latches to keep the disks in place, for the more expensive machine. For the cheaper machine, a DIN-plug cassette port.



FRIENDLY ADVANCES

The Advance 86 has WH Smith's backing in the business micro stakes. Geoff Wheelwright studies its form.

Imagine you were a retail chain store with a successful record of home computer sales, looking for a surefire and relatively painless way to get into the business personal computer market.

Imagine, in fact, that you were WH Smith and it doesn't take a lot to see what your next move would be. Along comes a small British company with Ferranti connections and a big, IBM-like box: you have the makings of a major sales push for the Advance 86.

So much for what you've no doubt already read in the ads. Yes, the Advance 86B is a cheap IBM compatible, it does have the support of WH Smith, a company which — it's worth noting — has not taken the Sinclair QL as its entry point into the low-end business market. The Advance, rather than the QL, has been chosen to do for WH Smith in the business market what the two previous Sinclair machines did for it in the home market.

The ZX81 and Spectrum were safe bets — they were each the cheapest of their kind

and offered to fill demand in a market no-one questioned was there. The QL — with its Microdrive storage, non-standard and as yet unfinished operating system and long delivery delays — is not such a sure winner.

IBM compatibility is supposed to be this year's formula for success. Advance is claiming IBM compatibility and a price advantage over comparable equipment.

First impressions

At first glance it would seem that the claims are justified. The Advance comes in two basic configurations, the first being a £399, 128K machine running the 16-bit 8086 processor.

Even this basic version comes with video outputs for RGB, composite video and ordinary TV (RF output). The cheaper version (hereafter known as the 86A) also includes a version of Microsoft Basic in ROM and a DIN-plug cassette port.

Also standard is a Centronics printer port using an IBM-style DB25 plug, and a

IBM compatibility — the hard truth

IBM-compatibility is a term much thrown-around these days, but not everyone is clear exactly what it means.

The only IBM compatibility which really matters is the full works and that doesn't just stop at the ability to run Microsoft's Flight Simulator. The flight simulator is a good yardstick but it doesn't say anything about hardware compatibility — the capacity to take IBM PC expansion boards and run standard IBM peripherals.

Although with a machine like the Advance Model B — which includes parallel and serial interfaces, RGB, composite video and TV outputs, analogue joystick ports and even an audio cassette interface as standard kit — you might already have everything you're likely to need, but expansion boards are still important. Luckily, the Advance has that compatibility too. If, for example, you wanted to use the Quadlink expansion board that carries a 6502 second processor to let you run Apple II programs, you would have to have made sure that your 'IBM-compatible' is not

only software compatible, but also board-compatible.

Having a machine that is software compatible only is not as far-fetched as it seems. IBM has produced three such micros.

The PC Junior doesn't have any room for IBM PC expansion boards, and standard boards are too long to fit in the portable and the XT. So even IBM doesn't make it's 'PC compatible' machines fully compatible.

For someone who wants a 16-bit machine for which they know lots of good software will be available via the IBM connection, even an 'almost IBM software compatible' like Sanyo's MBC555 will probably do.

For the slightly more demanding buyer who wants to be able to run every IBM PC package that will ever appear, only a full IBM compatible will do. No matter how good the 'software compatible' machines are, the software demands of the people using them could eventually call for some expansion cards. If the capability isn't there, the machine isn't a lot of use.

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What you should send

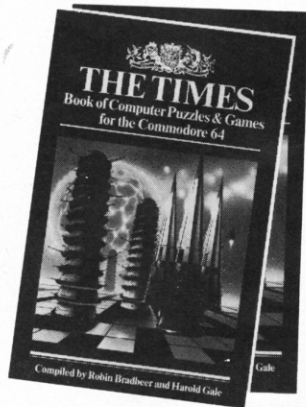
Send us the program listing, written in BASIC (not machine code), preferably on a cassette.

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These two books will be published
by Times Books and Sidgwick & Jackson
on 31st October 1984.

joystick connector. The all-singing B version of the machine (from which the A can be upgraded for £1,100) adds two disk drives, an RS232 communications port and the Perfect suite of software (word processor/spell checker/spreadsheet/database) and the enhanced disk-Basic.

Documentation

Ring-binders seem to be the order of the day for documentation on IBM-style machines, and in this the Advance is no exception. The documentation is the same for both versions of the machine.

The DOS and the Basic each receive a hefty chapter, with the system expansion, hardware overview and 'getting started' sections being kept to the minimum. This is probably as it should be. After all, how many times do you need to be told how to wire a new plug?

The section on Basic happily gives quite a few example programs, although there is some confusion about which commands are available in ROM Basic and which are exclusive to disk Basic. The documentation does, however, provide detailed descriptions of the meaning of various error messages — something that should be required of all manufacturers, by law.

The documentation for the disk operating system is a creditable rendering of how to come to grips with the MSDOS/PCDOS environment, dealing first with input/output and disk-handling and then getting into the usual word-by-word breakdown of the operating system.

Construction

The Advance seems well-built, although the keyboard has a slightly plastic feel, and weight seems to be compatible with that of the IBM. The drives make a bit of a racket and are slightly non-standard in that they have latches instead of doors to hold the disks in place.

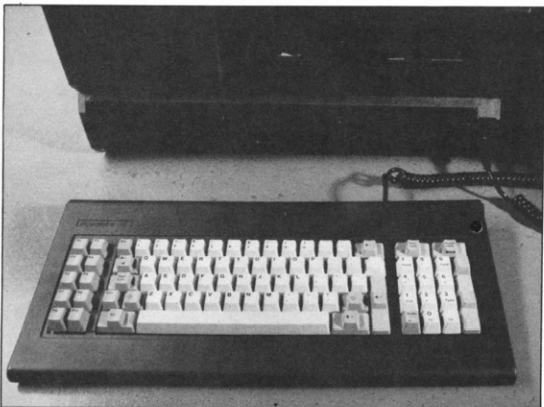
The 'smoked' plastic door for the keyboard did not win me over. Try as I might, I could find no easy way of getting the keyboard inside its supposed resting place without having to almost wrench the too-small door from the front of the machine. The problem is that unless you put a couple of books or something underneath the front of the machine, the door won't easily come down far enough to allow the keyboard to slide inside.

In use

Despite some cosmetic differences in the outward appearance of the hardware and the aforementioned tacky feel of the



The detachable keyboard tucks into the Advance marsupial-fashion, under the disk drives. The keyboard is full travel with ten function keys and numeric keypad.



Comparison between IBM and compatibles

	comms	RGB	RAM	Drives	Parallel	VDU	Bundled s/w	DOS	Price
Advance 86B	yes	yes	128	two	yes	no	Perfect	MSDOS	£1499
Sanyo MBC-555	no	yes	128	two	yes	no	Micropro	MSDOS	£899
IBM PC	yes	yes	128	two	yes	no	None	PCDOS	£2096
Compaq portable	yes	yes	256	two	yes	yes	None	MSDOS	£2270

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PCN.1

◀ 31 keyboard, the Advance essentially works like an IBM PC. The Advance passed the current flavour-of-the-year compatibility test (running Microsoft's Flight Simulator), although perhaps manufacturers are now making machines which are Flight Simulator compatible, but not necessarily fully IBM compatible.

As mentioned, the Advance B comes with the Perfect suite of disk-based software — including a word processor, spelling checker, database and spreadsheet. It's perhaps ironic that the only IBM program the Advance seemed to consistently reject was Perfect Link — a communications package that goes with the other programs in the Perfect suite. This could well be attributed to a slightly different hardware configuration of the on-board communications card.

The communications port did, however, work under Advance DOS such that you could send text.

I tried a wide range of IBM applications software with the Advance in a vain attempt to crash it. It had no troubles with IBM Wordstar, Lotus 1-2-3, Caxton Software's Brainstorm, and Microsoft's Flight Simulator. A moment's foolishness even urged me to try Softsel's Open Access integrated software package on the Advance only to find that it didn't work. I really thought I'd found something, until I realised that Open Access needs 256K to run and the Advance only comes with 128K.

So, unless my troubles with the comms port under Perfect Link turn out to be anything more serious, the Advance gets a provisional 100 per cent compatibility rating. Software, of course, isn't the only true compatibility test. Expansion boards for the IBM PC should work with the Advance as well, but I found that particular aspect of the machine hard to test as the Advance has almost everything as standard that you'd add in as an expansion board on the PC — with the possible exception of an extra 128K. The only cards I could get hold of gave the IBM capabilities the Advance already had: RGB colour, parallel printer output, serial communications, I/O, and joysticks.

Software

The Perfect suite has made appearances on a number of machines in the past year — including the Torch and BBC Torchpack, the Kaypro series and the Pied Piper portable. If nothing else, it is a suite that large numbers of people will be familiar with.

While not exactly integrated, the Perfect suite does have a similarity in the commands used throughout its packages. Unfortunately, this common structure is based largely on ESCape and ConTRoL sequences — although this version of the suite does make some use of the Advance/IBM function keys.

All the packages will do pretty much what you expect of them, although they are largely manual-driven rather than menu-driven (with the possible exception of the



Rear view: the Advance ports, RGB, composite, TV, printer, joystick, cassette, RS232 and mains, are all clearly labelled.

spreadsheet). This means that during the process of learning how to use the programs — you will have to spend some time poring over the manual — rather than rushing in and using the package straight away in the hope that overlaid help menus will get you out of tight spots.

The manuals for these programs are fortunately quite good and include lots of tutorial material that allows you to practise some common tasks in each of the programs.

Basic

I was quite impressed with the Advance's Basic. As the A version of the machine will depend heavily on the language's merits, I suppose this should have come as no surprise.

Unfortunately, the bits I was most impressed with are available only in Disk Basic and don't come with the barebones machine and it's those people without disk drives and MSDOS to play with who will most need the better Basic.

Among the nicer commands in Disk Basic are CIRCLE which provides a quick route to drawing circles, arcs and ellipses and PAINT which can be used to fill in any shape at any co-ordinates. You can also decide the colour of your painting with the variables p and e, which decide the colour of the fill and the edge colour of the object being filled.

PLAY is a very simple music command that lets you do a great deal without having

to use a lot of programming. The statement PLAY "OSCFEGABO4C" will play a scale starting at middle C and moving up to the next octave on the last note. The syntax for the PLAY command is based around strings. Instead of having a series of listed parameters, you simply type within quotes what you want the command to do. To play a middle C, you type PLAY "OSC".

The other 'variables' set the length of the note or notes that follow, pause the overall tempo of the music and you can also select the foreground mode so that a new sound causes the program to wait until the old sound has finished playing, or select the background mode which allows the music to automatically queue up so a Basic program can carry on executing while music is being played.

Verdict

The Advance is a very good deal. You would be hard-pressed to find a similarly-equipped, fully IBM-compatible PC for a better price. Although Sanyo's MBC555 looks a likely competitor — with the same extent of bundled software, two drives and 128K — it isn't as fully IBM-compatible as the Advance.

Also, it can't be built-up from a no-drives, sub-£400 cassette-based home micro like the Advance B.

So if you want an IBM-compatible desk-top micro, and don't mind it being big, black and bulky, this is probably the machine to get.

PCN

SPECIFICATION

Price	£1250 (£1499 including VAT, post and packing).
Processor	8086 running at 4.77 Mhz
RAM	128K
Text	80 × 25
Graphics	640 × 200
Keyboard	Detachable, full travel with ten function keys and numeric keypad.
Interfaces	Centronics, RGB, composite and UHF video, RS232C communications port, audio cassette interface, provision for two analog joysticks, 3 IBM-compatible expansion slots.
Storage	Twin 360K floppy disk drives
Language	MSDOS, Advance Basic
Distributor	WH Smith 01-353 0277

SOFTWARE

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Note to software publishers: If you wish your company's product to be included, please send only the very latest releases to Bryan Skinner, PCN, Software Editor, 62 Oxford Street, London W1A 2HG; and please don't forget to include prices and a telephone number.

Games

You can now play dirty with your 64 as New Generation has released its popular Spectrum game *Trashman* for the Commodore micro. Other conversions are *3D Tunnel* and *3D Escape*. In *Trashman* you have to collect dustbins from houses, empty them into the dustcart and avoid being run over by traffic as you cross the road.

Also on the 64 is *Where's my Bones?*, a maze-type game in which you, as the ghost of Brother Jeffrey, try to collect your bones so you can rest in peace. Each of your nine incarnations has nine shields, but these are easily lost by contact with the walls of the maze or any of the creatures which pursue you. *Tales of the Arabian Nights* needs a joystick and contains speech: your task is to guide Prince Imrahil through the perils of the night to seek out Princess Anitra.

Les Flies features you, the Pink Panther, versus Inspector Claudeau. You have to seek out the Purple Puma, a gemstone in Claudeau's care. The first part of the game is a simple maze affair, avoiding police

cars as you try to enter buildings. Entry takes you to the next level, a fairly standard 'snakes and ladders', stage scenario in which you have to climb stairs, avoiding policemen (les flies), l'inspecteur and his sidekick Kaoiin, and collect items. It's not an easy game, but there's nothing new in it.

Automata's *Dartz* is simply brilliant, though it can pall after a while. Like other darts games you can choose between one or two players and between 301 and 501. There's no need to score a double to start, but what makes the game easily the best of its class is the realism. On each round of three darts, you're shown the board, and the cursor moving clockwise can be stopped by any key.

You're then shown a close-up, where the cursor moves from bull to double, again stopped by a key press. The throw is made by Eric, depicted at bottom right, a table supporting his beer mug behind him, and the dart may make the target, miss, bounce out or, if Eric's had too much to drink, be dropped. Sometimes the flights are damaged, so the dart's path is less than true.

The graphics are superb, the atmosphere accurate, and it's a real hoot.

Tornado Low Level involves flying your craft across a detailed landscape in search of enemy installations, dropping down for a low level pass to

destroy them. You can climb, drop, turn, sweep the wings for fast or slow and your fuel level and other features are shown on a simple instrument panel which includes an advance warning radar. It's not a flight simulator, even if it does have some of the characteristics of one, but it's competent and difficult.

Beaky and the Egg Snatchers' first of three levels — which is high on impossible, so we can't describe the rest — resembles Microdeal/Tom Mix's *Buzzard Bait*. You have to collect eggs from platforms, but you're not strong enough to carry them, so you have to shoot down an Eggsnatcher carrying an egg, then catch the egg before it crashes to the ground.

Utilities

Computer-based machine code tutors are always welcome because they add an important interactive element to learning the arcane art of assembly language programming. *The Complete Machine Code Tutor* from New Generation has been released simultaneously on four machines and one of its best features is a processor simulator which allows you to modify and run the sample programs without fear of crashing your machine. The program has a number of lessons, each based on one aspect of op code usage and naturally includes an assembler.

Election Special can be used as a teaching aid or data source for British Election studies. It contains statistical information on elections since 1900, constituency details from 1983, opinion poll returns from 1945 and more. There are facilities for searching the database, printing results, entering new data and a graphics option to help users analyse trends. The documentation is good, and you'll need a disk drive.

RAD Systems has converted its Lynx programs for the Commodore 64. *Recipe Book 64* comes with European, Scandinavian and Indian recipes, and the data files can be updated, while *Enterprise 64* is an accounting system for home or business — but nothing to do with Star Trek.

Penguin Software's *Disk Arranger* allows you to sort your Apple's disk catalogues alphabetically or by file type, and catalogue customing is catered for. The utility can produce full disk maps, arrange for boot-up from any sector, rename and lock or unlock files.

Education

Count with Oliver, from Marmalade Software, introduces the concepts of counting, basic addition and subtraction. *Look Sharp*, from Wigit Software, aims to improve skills of observation and memory. Both programs are Spectrum conversions. PCN

APPLE

Expedition Amazon	\$34.95	Penguin (312) 232 1984 (Geneva)
Disk Arranger	\$29.95	..

ATARI

Machine Code Tutor	£14.95	New Generation 0225 316924
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BBC

The Election Program	£24.00	Social Science Software 051 653 3321
Machine Code Tutor	£14.95	New Generation 0225 316924
Management	£6.95	Cases Computer Sims 01-858 0763

COMMODORE 64

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Super Diary	£12.95	..
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Enterprise 64

Where's My Bones?	£7.00	Interceptor Micros 07356 71145
Tales of the Arabian Nights
Count with Oliver	£7.95	Mirrorsoft 01-353 0246
Look Sharp
Machine Code Tutor	£14.95	New Generation 0225 316924
3D Escape	£7.95	..
3D Tunnel
Trashman

SPECTRUM

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Tornado Low Level	£5.95	Vortex 061 973 9580
Machine Code Tutor	£14.95	New Generation 0225 316924
Dartz	£5.00	Automata 0705 735242
Clerky	£5.99	Unique 0753 655533
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EVERYONE'S DATABASE

Ian Scales files his opinion of this flexible IBM database.

The term database package is becoming an inadequate description for the wide range of software products which purport to help the assembly, storage, manipulation and retrieval of textual and numeric information.

At one end of the scale is the quasi-language approach of dBase II. Products like these are widely considered to be deep water for the uninitiated, and not a little bit of a challenge for those made of sterner stuff.

Most of these products fall somewhere between the full-blown database at one end and the simple card-index emulator at the other. The real question is how much data and what sort of base.

There's usually a trade-off between simplicity, represented by an easy-to-learn system and somewhat limited facilities — and sophistication, represented by greater flexibility but the requirement to spend a week or so sitting in front of a screen, learning the procedures and designing the system, or hiring someone else to do it.

One of the last great frontiers involves getting a system which manages to do both.

Everyman is not really such a system but it certainly takes several steps toward the goal as a powerful card-indexing system or a friendly database — take your pick — for the IBM PC. Vector International, the company responsible, labels the package 'sophistication with ease', which seems reasonable enough. We tested the package on the IBM PC-compatible Compaq and Advance micros and it ran happily.

Documentation

The packaging is the now-familiar box-and-ring-binder arrangement. The program itself sits with its tutorial on a single disk and the documentation runs to a sizeable 500 pages.

For those who like value for money the manual has the weighty feel you'd expect

One thing computers do best is to compare strings of data to see if they're the same or see if one string has a greater or lesser value than another. Given this ability it's possible to store large amounts of related information as data on a disk or series of disks and get the computer to do what, in human terms, is the difficult and time-consuming task of organising, cross-referencing and retrieving specific bits. It can also do a few nifty extras like add totals and print out address labels.

Earlier micros were never terrifically useful at this sort of task with their small memories and relatively low capacity storage systems. But now, with the upsurge in larger memories — 128K to 256K on the IBM PC and its compatibles — and lots of double-sided, double-density disk drives running with them, sophisticated database systems for micros can find a ready market.

for the price, but the non-technical needn't despair. It isn't a huge tome of indecipherable technical procedures and qualifications — mostly it's devoted to making the package and processes easy to learn.

Features

As with most professional packages these days, the system comes with a substantial and carefully prepared 200-page tutorial. All the example project systems reveal a nicely paced range of possibilities.

Everyman is an information management system dressed down as a simple card-box program. Vector has accurately (I think) understood the needs of the market, designing an all-round easy-to-use product which isn't going to be discovered lacking crucial features just when you've finished keying in the last record.

Care has been taken to make the processes understandable and the system has everyday symbols which remain consistent to the items they represent.

In use

Everyman understands its information as being recorded on cards. Related information is kept in a box, though information on the cards in this box can be cross-referenced to cards in other boxes. Data management facilities ensure that cross-referencing entries are created or deleted automatically with entry or deletion of dependent records.

Allied with this feature is the program's understanding of dependent and interdependent records. You cannot delete a record on a card in one box when the system knows a dependent item is still active in another box.

For instance, depending on the way you set up the system, you might find it impossible to delete an employee card from the wages box when the employee in question still has a card in the time sheet box. That's good news for the employee too.

Storing information in a computer may seem relatively simple, putting information under headings and retrieving it by name when you need it. But information management has always been a problematical area, especially for organising the relationships between categories of data in a system. Other computer applications look relatively straightforward in comparison.

For instance, there is usually little difference between the way one user sets up a word processing package and the way the man down the street does it — the boundaries of the application are well defined.

Information management applications, however, differ markedly between different users and different business or personal applications.

Most database packages tackle this problem by lowering the level of the program in the sense that in its raw state it's unstructured. The end user literally tailors it to suit his or her application.

This inevitably means, however, that you have to become your own programmer and learn an abstract set of commands and procedures.

The most innovative feature of Everyman is undoubtedly the diagrammatic representation of the boxes. As a system is being constructed the functional relationships between the categories of information (the boxes which contain the individual cards) are illustrated on a flow diagram.

Information boxes are entered by the user by positioning the cursor over the selected box and pressing return.

The reporting procedures are similarly powerful, though perhaps a little less easy to use. A lot of the usual expressions and procedures have to be gone through. Obviously, once a report format has been set up it can be used time and again with a little user-intervention such as date or output device.

Verdict

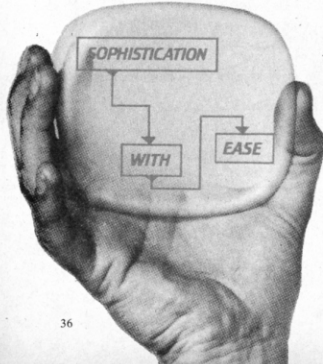
Everyman is very flexible — it should be possible to use the system for many applications, including simple accounting. It's easy to use, seems compatible with a wide range of PC compatibles, but still possesses enough power to take it out of the simple cardbox type of program. **PCN**

RATING (5)

Features
Documentation
Performance
Usability
Reliability
Overall value



Name Everyman **Price** £475 **System** IBM PC/HP 150 **Publisher** Vector International 01-734 2907/ 8/9 **Format** Disk **Other versions** None **Outlets** IBM dealers.



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FOR SPECTRUM 48K



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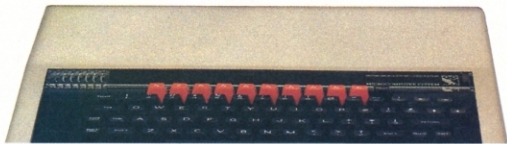
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Channels for the BBC. programme.



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The discs can be used for storage under the Acorn DFS system or for CP/M[®] programs and data.

A comprehensive software package is provided with the disc pack. It includes word and data processing and a spreadsheet program, along with utility programs and manuals.

The TORCH Z80 Disc pack is recommended by the CCTA for government use. The ZDP 240 – around £699 (ex. VAT).



The HDP 240

- 20Mbyte hard disc Winchester
- Double sided 400K floppy disc
- Integral power supply

For users who need much more storage capacity than is available on floppy discs and who require the large speed gains that a Winchester hard disc provides, the third new channel is now available. The UNICORN HDP240 combines a 400K floppy disc drive with a 20Mb hard disc and its associated controller. The pack connects directly to the disc and IMHz bus sockets on the BBC Model B.

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The HDP68K

- 8MHz MC68000 ● 6MHz Z80B
- 256K RAM (68000)
- 64K RAM (Z80)
- 20 Mbyte hard disc Winchester
- Double sided 400K floppy disc
- Integral power supply

The fourth channel in the UNICORN range is for users who need the extra processing power of a 68000 32 bit processor, as well as the Z80 running standard software. The UNICORN HDP68K provides the ultimate in performance, offering an extra 256K RAM and a 68000 processor running at 8 million cycles per second. It also contains a Z80 processor to allow the running of existing TORCH software.

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The Unicorn

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PCN136

TORCH

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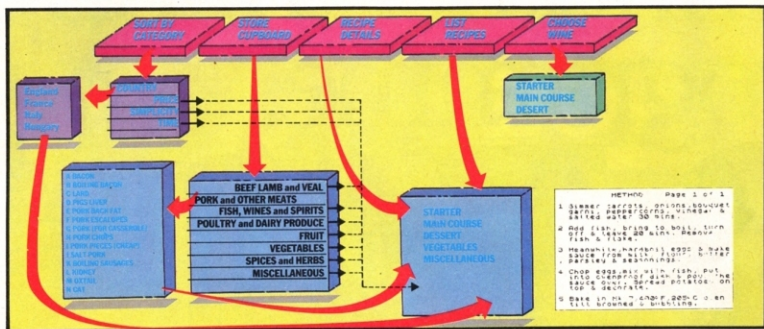
CP/M is a registered trademark of Digital Research Inc. Econet is a registered trademark of Acorn Computers Ltd. Unix is a registered trademark of Bell Telephone Laboratories Inc.

UK version Model B necessary. Disc interfaces are necessary for use with the Unicorn range.

Text and Graphics provided by BBC Model B. Keyboard provided by BBC Model B.

INSTANT COOKBOOK

Clare Gurton tastes the Computer Cookbook on her Spectrum and finds it dishes up a few treats.



Bug-Byte has recently launched what it claims to be the very first computer cookbook. The program was designed jointly by Bug-Byte and Ian Hoare, a freelance chef at British Routiers, and is labelled as a family program for the family computer. But I can't quite imagine the average Spectrum suddenly deciding to treat the family to Elizabethan Pork!

Presentation

The package retails at £9.50 and offers three programs on two tapes. One program is the Menu Planner and the other two are recipe instructions. Documentation for the package is limited but the programs are easy to load and self-explanatory.

Features

The Menu Planner is basically an index and the main menu offers five selections, each of which leads onto more specific program menus.

The sort facility allows you to choose dishes by country, such as France, Italy, Hungary and England; by ease of preparation; and by preparation time or price, all on scales of one to four. This scale does not go far enough and can be misleading; when it says £=4 it really means 'quite expensive'.

The Store Cupboard option lets you select a main ingredient and then gives you



recipe suggestions using this.

Recipe Details list the main ingredients for each recipe, together with indications of the relative price, simplicity and preparation time. The Recipe List shows all the recipes stored, in alphabetical order.

Choose Wine suggests one good wine and a cheaper alternative for each dish; it covers starters, the main course and desserts.

In Use

I looked in the fridge, found I had some

PCN PRO-TEST SOFTWARE

pork pieces and decided to see what I could do with them. Having selected Store Cupboard, I was able to select pork and other meats, which took me on to a further list of various pork cuts.

Selecting the pork pieces from the list I went on to the final selection which asked me to enter what type of dish the main ingredient was for—starters, main course, dessert, vegetables or miscellaneous.



Anyway, in my case, the pork was for a main course and up popped my recipe—stuffed peppers.

I returned to the main menu and Recipe Details gave me some idea of the other ingredients needed, together with the ratings for cost, ease and cooking time.

The second tape details recipes for dishes given in the Menu Planner. One track of the tape covers starters and main courses; the other has desserts, vegetables and miscellaneous dishes.

For each recipe the program will calculate the necessary quantities of ingredients for up to 200 diners.

For each type of dish, 20 different recipes are evenly grouped by country. Some main ingredients are limited, though. There is only one main course fish dish, a rather unadventurous fish pie.

The program suffers from inconsistent menu selection procedures. Sometimes you have to press a single key, at other times you have also to press ENTER. This may betray inelegant programming.

At one point the program asks you to press any other key to continue when it really means one of three.

Actually pressing any other key results in one of a half-dozen, rather facetious, error messages.

I felt suggested dish combinations would have been helpful. The structuring of the

programs should allow you to move between sections rather more easily. Once you've chosen a dish it's only natural to want to check out how to prepare it and it was tiring to have to load another program to look at the cooking method.

Several elements in the programs stand out as positive advantages, such as the speed with which you move from one section to another. Facilities for printout give you an instant shopping list. Calculation of quantities offers the choice of imperial or metric units, and there are also wine suggestions.

Verdict

Bug-Byte has succeeded in producing an unusual package with helpful tips and hints, suggested wines and hard-copy facilities, which would make a useful addition to many software collections.

However, room for improvement shows in program design and scope, even within the memory limitations of the Spectrum.



Here's a major games publisher looking at other uses for the home micro and I hope the trend will continue. Such programs may even encourage those who would not normally use a micro.

Nonetheless, for the price, I could buy a good cookery book with far more recipes and mouth-watering photographs. **PCN**

RATING (5)

Features

Documentation

Performance

Reliability

Ease of use

Overall value



Name The Computer Cookbook **Application** Meal Planner **Price** £9.50 **System** Spectrum 48K **Format** Cassette **Other versions** None **Supplier** Bug-Byte, Mulberry House, Canning Place, Liverpool L1 8JB (051) 709 7071 **Outlets** Retail/Mail order

ONLY
£3.50

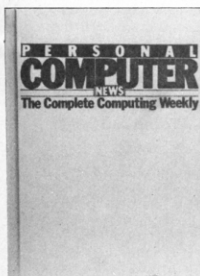
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ATARI

Nature lover

Name *Jungle Hunt System* Atari, 1 or 2 joysticks Price £24.99 Publisher Atari (Slough 33344) Format Cartridge Language Machine code Other versions None Outlets Retail.

Jungle Hunt is an arcade conversion sadly disappointing in almost every quarter as you take on the role of an all-action safari hunter whose trip is rudely interrupted by some distinctly unfriendly natives.

Objectives

Your travelling companion — described rather cutely as a 'sweetie' — has been abducted by cannibals who aim to put somebody into their stew and you must brave the perils of the jungle to rescue her. You accept this challenge at one of three difficulty levels, each of which gives about eight minutes to complete the task.

In play

The idea is to work your way through four screens which scroll smoothly from left to right, starting in a jungle scene with your man perched on the branch of a tree gazing a little warily at a swinging vine. As there's very little else on the screen and you've got a job to do, you leap on the vine, Tarzan-style, to make your way across a few more with a simple fire-button routine. This stage is tediously simple, even at the hardest setting when the odd monkey tries to knock you from the vine.

After all that exercise comes a welcome dip by diving from the last creeper into a river full of crocodiles which you stab to earn points, though it's easy enough to slip by them if you're a nature lover. The other river hazard is mud which bubbles from the bed and pushes your man slowly to the surface, making him easy meat for the crocs who have no qualms about blood sports. While underwater you must also keep an eye on your air supply and nip to the surface occasionally to take a breath.

The next stage is a hillside with boulders bouncing down, which your man — still full of energy — must jump over or duck beneath before making his way to the final screen. This is the hardest of the lot and involves jumping over the cannibals to save your 'sweetie' who is hanging over a cauldron.

Sounds fine on paper but in play the game is a real yawn. The graphics are weak by Atari standards while the sounds are very poor, particularly at the river stage where the swimming man sounds like a train and his stabbing action is a dead ringer for gunfire.

Verdict

If I were the hunter I'd leave the 'sweetie' to the cannibals and go home to play *Donkey Kong* — or even tidily-winks.

Simon Clarke

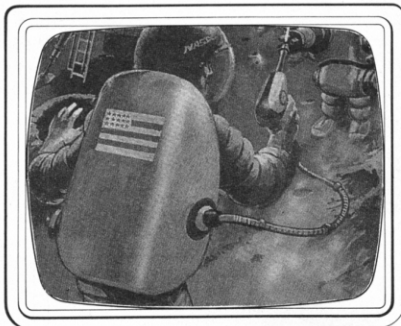
RATING (5)

Lasting appeal

Playability

Use of machine

Overall value



Robot mob on attack

Name *Arena 3000 System* Atari, 1 or 2 joysticks Price £8 Publisher Microdeal 072667676 Format cassette/disk Language Machine code Other versions BBC, Commodore 64, Electron, Oric, Spectrum Outlets Retail/Mail order

Fancy yourself as Spartacus? Well, this could be your big chance, but the snag is this time you're stuck in the arena for good. Being a robot may be pretty revolting, but that's the nearest to revolution you're likely to get...

Arena 3000 is a one or two-player arcade game, similar in some respects to *Robotron* but without the compassionate lifesaving elements. The joystick options enable you to use only one to control movement and firing, or split the functions between two — tricky unless they are the suction pad variety or you've got four hands.

Objectives

The year is 3000 AD, and you have been transmuted into a semi-human machine (a feeling not unfamiliar to most gamers after a night at the keyboard). You must prove your worth against an increasingly belligerent mob of robot gladiators.

In play

A silent introduction offers one or two-player options, then it's into the fray against some fairly inoffensive opponents in the first arena. In this, and subsequent levels, you are confined to the screen limits as you blast away at robots which home in

with distressing inevitability.

The early stages are simple enough but give a hint of frenetic action to come. That arrives in the form of wave after wave of frenzied attackers needing more and more firepower to destroy them.

These attacks demand instant reactions and a finger permanently on the fire button in single joystick play as you fend off *Ty Fighters*, *Crabs*, *Spiders* and a few other meanings which should have been stamped out centuries earlier.

The graphics are elementary but more than adequate. During the later screens it would hardly matter what the robots look like because there is little time to take in detail, so fast and furious is the action. Use of sound is limited to a disappointing minimum — shots firing, robots snuffing it and the player's own demise, plus a welcome little fanfare for a bonus man every 20,000 points.

A nice touch, too often lacking in Atari games, is the use of a high score table which seems almost extravagant by comparison with the rest of the graphics.

Verdict

This reasonably-priced game, simple in theory and out-dated in practice provides a tough challenge for anyone looking for a pot-boiler to sharpen the trigger-finger before spending some time on something requiring a bit more brain power.

Simon Clarke

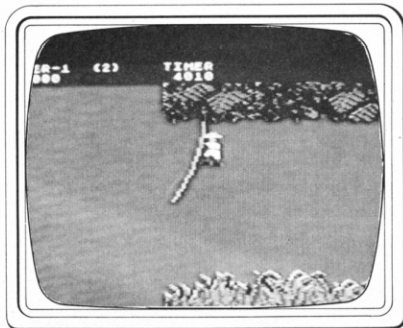
RATING (5)

Lasting appeal

Playability

Use of machine

Overall value



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BBC/ELECTRON

Insomnia solver

Name Bed Bugs **System** BBC Micro B & Electron **Price** £6.95 & £8.95 **Publisher** Optima Software, 36 St Petersgate, Stockport. Tel 061 4568836 **Format** Cassette & 40/80 track disk **Language** Machine code **Outlets** Mail order and dealers.

As more and more games become available for the BBC Micro (and the Electron), their plots seem to be increasingly bizarre. Optima has entered the fray with a program based around fleas, sandwiches and false teeth.

Objectives

The game is set in bed and your sole aim is to protect your feet from the ravages of fleas and bed-bugs. The longer you survive, the more pests arrive to do battle with your extremities.

In play

The program loads easily to display a set of instructions and list of parasites and weapons. The main play screen consists of the plan view of a bed with a small menu of 'icons' down one side. The game uniquely offers several playing pieces selected by moving a hand-shaped pointer.

As each piece is chosen it moves from its place in the menu to the top of the bed and may then be moved using the cursor keys or joystick.

At the start you have a brief glimpse of the position of your

feet, which then disappear under the bedclothes.

An increasing number of fleas appear and move randomly about the bed, biting your feet if they move over them. You're allowed eight flea bites or one bed-bug bite before the game ends.

Other ways of ending the game include swatting your own feet, moving your jam sandwich(!) off the bed or running into a puddle of jam from a previous swat. The different weapons available include the sticky sandwich, a sponge for wiping the jam away, a set of chomping false teeth, which are good for fleas and bugs, and a phone for emergencies.

Using the 'phone involves selecting it from the icon, whereupon it moves to the top-left of the bed and rings. When it's answered, you may be lucky enough to have dialled Pestdeath, who will destroy all fleas on the bed, or Dr Soothe, who will cure all your bites. Using the facility too often just gets: 'Sorry, wrong number'.

Verdict

The idea is novel and a game using decent-sized icons is welcome. These don't move particularly smoothly, however, the fleas move completely randomly and a swat with the sandwich is not always successful.

Simon Williams

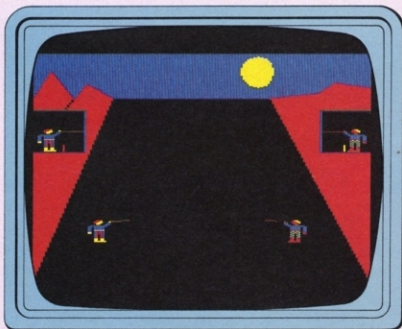
RATING (5)

Lasting appeal

Playability

Use of Machine

Overall value



For gay blades

Name Sword Master **System** BBC Micro Band and Electron **Price** £7.95 **Publisher** Acorn User Software, 68 Long Acre, London WC2 **Format** Cassette **Language** Basic/Machine code **Outlets** Mail order

In the 12th Century, hidden away in a secret valley, men of the Deutscher Order of Teutonic Knights settled affairs of honour by the sword. Neither man gave or expected quarter. The winner would be raised in rank from Greenhorn. The loser, on the other hand...

Objectives

So runs the rather pretentious storyline to this two-player swordfight game. For all its pretensions, however, Sword Master is a unique game in which each player tries to gain the upper hand by deft movement of swordsman and blade. On receiving sufficient injury, the opposing knight gives up the ghost.

In play

The storyline wiggles up the screen accompanied by an apt Teutonic tune before the instructions and controls are displayed and each player enters their name and skill level.

The graphics are simple, but smooth and nicely done.

The view of the battleground is limited to a tapering road running up the screen, flanked by foothills sloping upwards, a sun toward the top right and the two large players mid screen.

Control may be from the keyboard or a pair of joysticks,

with the latter being considerably easier to use. The battle proper starts after these preliminaries and hits are registered by two 'scoremen' in the hills, whose swords move down a fraction at each wound. This is a nice touch, but it's a pity the previous position of the scoreman's sword is not removed. Towards the end of each game they appear to be holding fans.

When one knight finally hands in his spurs, the winner is congratulated before moving up a step in the hierarchy for another fight. A scorecard is maintained, which may be saved and reloaded separately.

It is rather annoying to have to re-enter both name and rank of each contestant between fights, particularly since you can build up quite a dislike for your opponent and are only too anxious to issue an immediate return challenge.

Verdict

This is one of the few two-player games that makes more than a token gesture towards truly interrelated action. The graphics are smooth, the characters large enough to be sensibly controlled, and the background, though fairly simple, is enough to set the scene.

All you really need is a second player who is prepared to compete with you, and according to the Order of the Teutons, he must not look at women (especially young ones), nor kiss his mother or sister.

Simon Williams

RATING (5)

Lasting appeal

Playability

Use of machine

Overall value



REACTOR FORCE

Reactor Force from Alan M Farquhar in Banff, Scotland, is a game calling for tactics rather than speed to be played on the Oric-1.

Bill, the intergalactic hero, must try and prevent a nuclear reactor from exploding. To inspire him there are a few bars of the Star Wars theme music before he sets off on his heroic task. Radiation has already made the robot guards malfunction and they will destroy Bill on contact. Equally lethal are the mutant loads (Buzz Buggs) which jump about randomly impeding his progress.

To save the reactor, Bill has to break through four barriers one after another. He moves through a maze avoiding destruction with the purpose of collecting four sticks of dynamite. He must also find and jump into his space capsule before he can blow up the barriers safely.

Fortunately, complete success isn't necessary as points are scored for each stick of dynamite collected, for each barrier destroyed and for reaching his capsule. However, to get the full treatment including part of Tchaikovsky's 1812 Overture complete with cannon, Bill must clear 10 reactor levels. Luckily Bill is no ordinary mortal and has three lives.

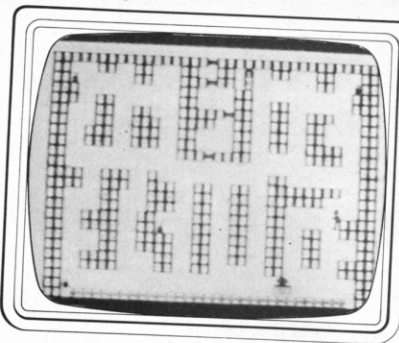
If you watch carefully you will be able to work out the details of the robot patrol but the random mutant loads will be a constant source of irritation.

Program notes

- 45 Disable key-click and cursor.
51 Redefine characters by subroutine 10000.
55 gosub to game introduction.
65 gosub to instructions.
69-75 Countdown to game.
280-570 Sets up background maze.

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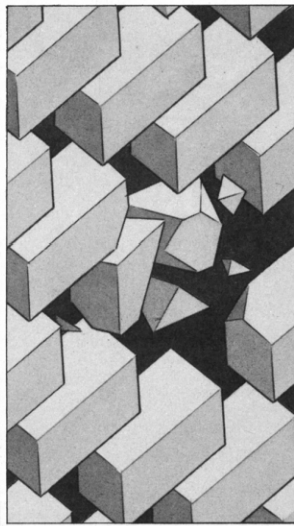
10 REM *****
20 REM * REACTOR FORCE *
30 REM * BY ALAN M FARQUHAR *
40 REM *****1984*****
45 POKE410,10
50 CLS
51 GOSUB10000
55 GOSUB9700
56 PING
61 CLS:IFAS="1"THENG0T069
65 GOSUB4500
69 PAPER0
70 FORX=5 TO 1 STEP-1
71 PLOT19,13,STR$(X):PLOT18,13,"
  *
72 PLOT19,14,STR$(X):PLOT18,14,"
  *
73 POKE4850,10:POKE48619,10:INKEY
74 PLAY400,400,400,400
75 WAIT60
76 NEXT
80 LI=3
85 SC=0
90 LD=10
100 SC=34
110 EA=0
120 L=5
130 P=27
135 LETK=0:NN=0
140 C=5
150 T=22
160 TI=0
280 REM*****DRAW MAZE*****
*****
281 IFLD:(0)THENG0T07000
290 CLS:PAPER7:INK7
300 PRINT:PRINT:PRINT
310 PRINT "ddddddddddddddddddddd
  dddddddddddddd"
320 PRINT "d d d d d d d d d d
  d d d d d d d d d d
  330 PRINT" dd d d d d d d d d
  p d d n d d
  340 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  350 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  360 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  370 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  380 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  390 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  400 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  410 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  420 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  430 PRINT" d d d d d d d d d d
  d d d d d d d d d d
  
```



Title: Reactor Force
Machine: Oric-1
Language: Oric Basic
Application: Game
Author: Alan M Farquhar

```

d d d d d d d d d d
440 PRINT" d d d d d d d d d d
d d d d d d d d d d
450 PRINT" d d d d d d d d d d
d d d d d d d d d d
460 PRINT" d d d d d d d d d d
d d d d d d d d d d
470 PRINT" d d d d d d d n d d d
d d d d d d d d d d
480 PRINT" d d d d d d d d d d d
d d d d d d d d d d
490 PRINT" d d d d d d d d d d d
d d d d d d d d d d
500 PRINT" d d d d d d d d d d d
d d d d d d d d d d
510 PRINT" d d d d d d d d d d
d d d d d d d d d d
520 PRINT" d d d d d d d d d d
d d d d d d d d d d
530 PRINT" d d d d d d d d d d
d d d d d d d d d d
540 PLOT1,26," d d d d d d d d d d
*****
550 POKE49085,5:POKE49116,0
560 INKEY
567 WAIT40
570 POKE48042,17:POKE48082,17
590 REM*****MAIN GAME LOOP*****
*****
600 RD=4:RA=24
605 O=10:U=14
606 D=31:R=30:Z=0
610 X=34:Y=24
620 RX=51:RY=24
621 B=0:S=6
622 F#="":F#B#="g"
626 PLOTX,Y,FS:PLOTX,Y+1,B#;IFLD
<1)THENG0T27ELSENAITLD
627 LETI=I+1:IFTI>350THEN4010
628 PLOT2,I,"LIVES - ":PLOT9,1,S
TR$(LI):PLOT9,1," "
629 PLOT2,I,"TIME - ":PLOT34,1,
STR$(TI):PLOT34,1," "
630 PLOT13,1,"SCORE - ":PLOT20,1,
STR$(S):PLOT20,1," "
631 PLOT2,0,"REACTOR LEVEL - ":P
LOT18,0,STR$(LD):PLOT18,0," "
632 PLOT24,0,"DYNAMITE - ":PLOT3
4,0,STR$(DV):PLOT34,0," "
633 REH*****ROBOT 1*****
*****
639 IFL:31)THENG0T66SELSE650
640 IFL:31)THENG0T650ELSE665
650 LETNN=1
660 PLOTR+NN,RY,"k":PLOTRX+NN,
RY+1,"j":LETL=L+1:GOTO600
665 LETNN=1
670 PLOTR+NN,RY,"k":PLOTRX+NN,
RY+1,"j":LETG=G-1:IFG=7)THENL=5:
G=3
4
473 G0T060
675 REM*****ROBOT 2*****
*****
  
```



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REACTOR

REACTOR

- 626 Plots Bill on the screen.
627-632 Sets up timer and score board.
638-673 Moves the first enemy robot back and forth horizontally.
675-710 Moves the second robot up and down.
800-820 Bill is destroyed by a robot.
1500-1640 Create random movement of four Buzz Buggs.
1900 Bill is hit by a Buzz Bugg.
1950 Bill gets through the last barrier and completes a screen.
2000-2230 Unplot all the characters and scan keyboard for Bill's position controls.
2250 Is Bill inside the capsule?
2260 Has he picked up any dynamite?
2270 Has he broken a barrier?
2505 Has he hit a wall?
2510-2540 If he has hit a wall, move back a space to avoid deletion.
3000-3030 Unplot the Buzz Bugg.
4000 Back to the beginning of the loop.
4040 'SpLat sequence', with sound effect.
4099-4120 Bill enters the space capsule.

```

680 IFC>22THENGOT0740ELSE745
690 IFC>22THENGOT0745ELSE745
745 LETK=KK+1
750 PLOTX,RD+KK,"1*";PLOTX,RD+
+1+KK,"1";LETCC=1;GOTD80
760 LETK=KK-1
770 PLOTX,RD+KK,"1*";PLOTX,RD+
+1+KK,"1";LETT=T-1;IFT=4THENC=5
T=2
2
800 REM*****ARE YOU KER-SPLATTED?
805 IFCR(X,Y)>104THENGOT0806EL
SE810
806 IFCR(X,Y)<109THENGOT0410E
LSE810
910 IFCR(X,Y+1)>104THENGOT0820
ELSE1488
820 IFCR(X,Y+1)<109THENGOT0401
ELSE1488
1488 REH*****BUZZ-BUGS*****
*****
1500 H=INT(RND(1)*(-3))+2
1501 B=0-M
1502 IFC>13THENB=13
1505 IFC<5THENB=5
1510 PLOTB,S,"M"
1520 H=INT(RND(1)*(-3))+2
1530 D=0-M
1531 IFC<14THEND=14
1532 IFC>23THEND=23
1540 PLOTD,U,"M"
1550 H=INT(RND(1)*(-3))+2
1560 D=0-M
1570 IFC>28THEND=28
1580 IFC>35THEND=35
1590 PLOTU,U,"M"
1600 H=INT(RND(1)*(-3))+2
1610 R=R-M
1620 IFC>26THENR=26
1630 IFC>34THENR=34
1640 PLOTR,Z,"M"
1900 IFCR(X,Y)>109THENGOT04020
1910 IFCR(X,Y+1)>109THENGOT040
20
2000 IFC=2THENDL=D-1;GOT06450
2050 REH*****MOVE-INPLOT01*****
*****
2010 K=PEEK(520)
2015 PLOTX,Y,"";PLOTX,Y+1,""
2020 PLOTX+HN,R,Y,"";PLOTX+HN
+1,R+1,""
2030 PLOTX,RD+KK,"1*";PLOTX,RD
+1+KK,"1"
2200 IFC=(177)THENY=Y-1
2210 IFC=(174)THENY=Y+1

```

```

2220 IFC=(157)THENX=X+1
2230 IFC=(149)THENX=X-1
2250 IFCR(X,Y)>111THENPLAY,0,
1,1600;LETSC=9C+100;GOT04100
2260 IFCR(X,Y+1)>110THENDY=DY
+PLAY33,44,33,300;LETSC=SD+30;D
OTO
3000
2270 IFCR(X,Y)>104THENGOT04130
2510 IFCR(X,Y)<32THENGOT02510
ELSE2505
2505 IFCR(X,Y+1)<32THENGOT25
10ELSE3000
2510 IFC=(177)THENY=Y+1
2520 IFC=(174)THENY=Y-1
2530 IFC=(149)THENX=X-1
3000 PLOTB,S,"M"
3010 PLOTD,U,""
3020 PLOTU,U,""
3030 PLOTR,Z,""
4000 GOTD324
4010 REH*****KER-POM*****
4011 POKE49085,B
4012 PLAY200,200,200,1000
4020 PLOTX-1,Y,"q";PLOTX-1,Y+1
,"tuv"
4030 PLAY200,200,200,1000
4040 WAIT200;LETL=L-1
4061 DY=0
4070 IFC<1THENGOT20010
4080 IFC<10THENGOT0100
4090 REH*****ESCAPE*****
4100 FS="O";BS="P";EA=9
4110 PLOT23,4,"";PLOT23,5,""
4120 GOTD2260
4130 REH*****OUT-AND-AWAY*****
*****
4131 IFDY<1THENGOT2500
4132 IFFS="F"THENGOT04010
4140 PLOTX,Y-1,""
4150 PLOTX,Y-1,"X"
4151 WAIT2
4152 PLOTX,Y-1,""
4160 PLAY200,200,200,200
4170 LETSC=SC+30
4171 LETDY=DY-1
4180 GOTD3000
4500 REH*****TITLES*****
*****
4501 CLS:PAPER?;INK0;PRINTCHR(1
451
4510 PRINTCHR(145)" REACTOR F
ORCE BY ALAN FARQUHAR"
4520 PRINTCHR(145)"
*****
4530 PRINT:PRINT" CAN YOU,BILL
,THE INTERGALACTIC"
4540 PRINT" HERO STOP THE REAC
TOR FROM"
4550 PRINT" EXPLODING"
4560 FORDS=13 TO 25
4570 PLOTDS,B,""
4580 WAIT40
4590 NEXTDS
4600 PLOT26,B,"?"
4610 WAIT50
4620 IFC<10THENPRINT" THE LEATHAL
PLUTONIUM RODS ARE"
4630 PRINT" OVERHEATING AND TH
E RESULTING"
4640 PRINT" SEEPAGE HAS CAUSED
HUGE ROBOT"
4640 PRINT" GAURDS TO MALFUNC
ION AND RUN"
4650 PRINT" WILD THROUGH ALL 1
0 LEVELS."
4660 PRINT:PRINT" THE RADIATIO
N IS CAUSING GANGS"
4670 PRINT" OF INNOCENT TOADS
TO MUTATE"
4680 PRINT" INTO DEADLY BUZZ-B
UGS (GASP),"
4690 PRINT:PRINT" IF YOU ARE B
EING ENOUGH TO"
4700 PRINT" FACE THESE DANGERS
THEN PRESS"
4710 PRINT" THE SPACE BAR...IF
YOU'RE NOT,"
4720 PRINT" CRAWL INTO A CORNE
R AND SHOOT"
4730 PRINT" YOURSELF."
4735 INK0
4740 REPEAT:UNTILKEY= "
4745 CLS;INK?;PRINT
4750 PRINT:PRINTCHR(148)" PL
AYING THE GAME?;PLOT11,2,"*****
*****
*****
4790 PRINT:PRINTCHR(146)" (1)
- THE GRAPHICS:PRINT *****
*****
*****
4800 PRINT" f - BILL h

```

```

h - BARRIERS"
4810 PRINT" g"
4820 PRINT:PRINT" a - BUZZ-
BUG n - DYNAMITE"
4830 PRINT:PRINT" ik - ROBOT
GAURD:PRINT" j1"
4840 PRINT:PRINT" o - ESCAP
E CAPSULE:PRINT" p"
4850 PRINT:PRINT" e - FORCE
FIELD GENERATOR"
4855 POKE226F,9;DOKE226D,48720
4860 PLOT1,19," THE DYNAMITE I
S USED TO DESTROY"
4870 PLOT1,20," THE BARRIERS W
HICH COVER THE EXIT"
4880 PLOT1,21," FROM THE LEVEL
BEFORE USING THE"
4890 PLOT1,22," THE DYNAMITE Y
OU MUST BE INSIDE"
4900 PLOT1,23," YOUR ESCAPE CA
PSULE."
4901 INK0
4910 PLOT1,26," PRESS
SPACE BAR"
4915 GETA#;IFA#(<)" THENGOT04915
4920 CLS
4930 PLOT1,19," A LINE OF FORC
EFIELD GENERATORS"
4940 PLOT1,19," AT THE BOTTOM
OF THE SCREEN KEEP"
4950 PLOT1,21," BILL'S JET-PAC
OPERATIONAL, IF"
4960 PLOT1,22," YOU TAKE TOO L
ONG TO COMPLETE"
4970 PLOT1,23," THE SCREEN THE
FORCEFIELD IS:PLOT4,24,"DEACTI
VAT
ED.(SPLAT)"
4980 PLOT1,26," PRESS
SPACE BAR"
4990 GETA#;IFA#(<)" THENGOT04990
5000 POKE226F,27;DOKE226D,48000
5005 CLS;INK?
5010 PRINT:PRINT" (2) -
THE OBJECTIVE"
5020 PRINT" *****
*****
5030 PRINT:PRINT" THE OBJECTIV
E OF THE GAME IS TO"
5040 PRINT" ESCAPE FROM EACH L
EVEL BY"
5050 PRINT" DESTROYING THE BAR
RIERS."
5060 PRINT:PRINT" IN EACH LEVE
L YOU ARE PITTED"
5070 PRINT" AGAINST THE TIME.W
HICH YOU HAVE"
5080 PRINT" RUNS OUT YOU WILL
BE KILLED "
5090 PRINT" UNLESS YOU HAVE MA
NAGED TO ESCAPE."
5100 PRINT" FORTUNATELY YOU HA
VE 3 LIVES"
5110 PRINT:PRINT" TO PICK UP T
HE DYNAMITE"
5120 PRINT" ENTER YOUR ESCAPE
CAPSULE SIMPLY"
5130 PRINT" FLY" INTO THEM."
5140 PRINT:PRINT" THE LESS TIM
E YOU TAKE TO"
5150 PRINT" COMPLETE A SCREEN
THE MORE POINTS"
5160 PRINT" YOU WILL GAIN."
5170 PRINT" EACH STICK OF DYNA
MITE AND "
5180 PRINT" BARRIER BROKEN IS
WORTH 30 POINTS"
5190 PRINT" WHILE YOUR ESCAPE
CAPSULE IS "
5195 PRINT" WORTH 100 POINTS"
5196 INK0
5200 PLOT1,26," PRESS
SPACE BAR"
5201 GETA#;IFA#(<)" THENGOT05201
5210 CLS;RETUR
5220 PRINT:PRINT" AND F
INALLY....."
5230 PRINT" *****
*****
5240 PRINT:PRINT" YOU HAVE UNT
IL THE TIMER"
5250 PRINT" REACHES:ICHR(140)
="35"
5260 FORX=1 TO 6:PRINT:NEXT:PRIN
TCHR(146)" C O N T R
O L S
"
5270 PRINT:PRINTCHR(148)" O -
UP
P - LEFT"
5280 PRINT:PRINTCHR(145)" A -
DOWN
O - RIGHT"
5400 PLOT1,26," PRESS SP
ACE BAR"
5500 GETA#;IFA#(<)" THENGOT05500
5510 CLS;RETUR
6450 FOR K=1 TO 3
6455 FORW=100 TO 0 STEP-40
6460 SOUND1,W/2,0
6465 PLAY0,0,5,5
6470 NEXTW
6475 PLAY0,0,0,0
6480 WAIT20;NEXTE

```

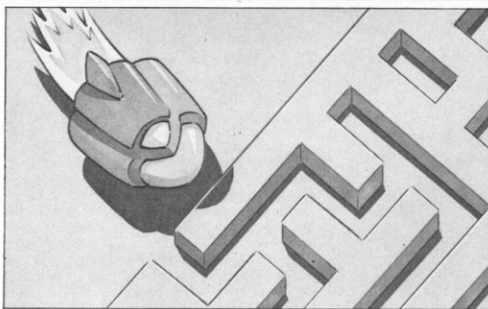
PCN PROGRAMS: ORIC

PCN PROGRAMS: ORIC 1



4130-4180 Routine for breaking through a barrier.
 4500-5510 Displays instructions.
 4855 Prevents the top 17 lines from scrolling.
 5000 Lets the top 17 lines scroll.
 6450-6995 Tells you your Time Bonus and updates your score with a musical intro.
 7000-7380 Congratulates you on your success with 1812 Overture accompaniment.
 9700-9830 Play Star Wars theme.
 9900-9980 Scrolls double height characters horizontally across the screen.

10000-20000 Redefines characters.
 20010-20400 Organises and prints out the high score table.



```

6500 CLS
6505 PING
6510 PRINT:PRINT:PRINT
6520 PRINTCHR(138);CHR(132);
    TIME BONUS !";
6530 PRINTCHR(138);CHR(129);
    TIME BONUS !";
6535 INK7
6540 YB=250-TI
6545 POKE4B410,14;POKE4B450,14
6550 PLOT12,9;"350";PLOT12,10;"3
50"
6560 PLOT16,9;"-";PLOT16,10;"-"
6570 PLOT17,9;STR(TI);PLOT17,9;
0;"
6580 PLOT17,10;STR(TI);PLOT17,1
0;"
6590 PLOT22,9;"-";PLOT22,10;"-"
6700 PLOT23,9;STR(YB);PLOT23,9;
0;"
6710 PLOT23,10;STR(YB);PLOT23,1
0;"
6720 PLOTS,13;"CAN BILL SURVIVE
ANY LONGER?";
6730 PLOT18,19;"1";PLOT16,20;"m
11 8"
6740 PLOT13,22;"REACTOR FORCE="
6750 PLOT13,24;CHR(96);PLOT15,2
4;"A.FAROUHAR."
6900 INK0
6990 LETSC=SC+YB
6995 WAIT200;GOTO100
7000 REM*****THE END*****
*****
7010 CLS:PAPER0;INK0
7015 POKE4B042,23;POKE4B162,23;P
RINT
7020 PRINTCHR(142);CHR(129);"
CONGRATULATIONS"
7030 PRINTCHR(142);CHR(129);"
CONGRATULATIONS"
7040 PRINT:PRINT:PRINT
7050 PRINTCHR(147);"CONGRATULATI
ONS! YOU HAVE COMPLETED"
7060 PRINTCHR(145);"ALL 10 LEVEL
S OF THE REACTOR!";
7070 PRINTCHR(150);"YOUR FINAL S
CORE IS IS "SC" !!!";
7080 PRINTCHR(149);"WELL DONE!!
TOP INTERACTACTIC HERO!";
7085 PRINT:PRINT:PRINT:PRINT
7090 REM*****1812*****
*****
7092 WA=45
7095 PLAY7,0,0,0
7100 REM*****FIRST BAR*****
*****
7101 FORL=1 TO 2
7102 FORX=1 TO 2
7105 MUSIC1,3,2,15
7115 WAITWA
7116 MUSIC1,3,2,0
7120 NEXTX
7125 WA=25;NEXTL;WAIT4
7127 REM*****SECOND BAR*****
*****
7130 MUSIC1,3,4,15
7140 WAIT33
7145 MUSIC1,3,6,15
7155 WAIT33;MUSIC1,3,4,15;WAIT3
3
7156 REM*****THIRD BAR*****
*****
    
```

```

7160 MUSIC1,3,2,15;WAIT33;MUSIC1
,3,4,15;WAIT33;MUSIC1,3,6,15;WA
I760
7170 REM*****FOURTH BAR*****
*****
7175 MUSIC1,3,2,15;WAIT50;MUSIC1
,1,1,0;MUSIC1,3,2,15;WAIT50;PLA
Y0,0
,0,0
7180 EXPLODE;WAIT50;EXPLODE
7190 PRINTSFC(16);CHR(135);"Y";P
RINTSFC(16);CHR(135);"1"
7200 PRINT:PRINT
7210 PRINTCHR(156);"AND BY BREAK
ING THROUGH THE BARRIERS"
7220 PRINTCHR(145);"YOU HAVE REL
EASED THE PRESSURE WHICH"
7230 PRINTCHR(146);"WAS BUILDING
UP INSIDE THE REACTOR!";
7240 PRINT:PRINT:PRINT
7249 PRINTCHR(149);CHR(140);"
PRESS SPACE BAR"
7350 PLOT22,14;"BELIEVE IT OR NO
T";PLOT22,15;"A NUCLEAR REACTOR"
*****
7351 PLOT20,14;"b";WAIT50;PLOT2
0,14;"b";WAIT50
7360 K=PEEK(520)
7370 IPK=132;THEN20010
7380 GOTO7351
9700 REM*****TITLE THERE*****
*****
9710 PLAY7,0,0,0
9720 FORI=1 TO 2
9730 REM*****FIRST BAR*****
*****
9735 FORF=1 TO 3
9740 MUSIC1,2,3,15;MUSIC2,3,3,15
9750 WAIT16;MUSIC1,2,3,0;MUSIC2,
3,3,0
9760 NEXTF
9770 REM*****SECOND BAR*****
*****
9780 MUSIC1,2,8,15;MUSIC2,3,8,15
;WAIT180;MUSIC2,4,3,15;WAIT100
9785 REM*****THIRD & FOURTH BAR
*****
9790 N=3
9900 FORX=1 TO 2;MUSIC1,4,N,15;M
USIC2,4,1,15;WAIT16
9905 MUSIC2,3,12,15;WAIT16;MUSIC
2,3,10,15;WAIT16
9910 WAIT4
9915 WAIT180;MUSIC2,4,3,15;MUSIC1
2,4,3,15;WAIT50;NB=NB+1;NEXTX
9915 REM*****FIFTH BAR*****
*****
9920 MUSIC1,4,3,15;MUSIC2,4,1,15
;WAIT16;MUSIC2,3,12,15
9925 WAIT16;MUSIC2,4,1,15;WAIT16
;MUSIC2,3,10,15
9930 WAITNB;NB=NB+1;NEXTX;MUSIC1,1,1,0;M
USIC2,2,2,0
9990 REM*****INTRODUCTION*****
*****
9910 NB=" ALAN FAROUHAR PROUD
LY PRESENTS, FOR THE ORIC, RE
ACT
OR FORCE."
9920 DOW=EC26B,010A
9930 CLS
9940 PLOT0,10,17;PLOT0,13,17
9945 FORPM=1 TO 35
9950 PLOT1,1,1,LET(AS,3B)
9960 PLOT0,12,LEFT(AS,3B),3B
9970 AS=MID$(AS,2)+LEFT$(AS,1)
9978 WAIT10
9979 INKTRM
9980 WAIT200
9982 CLS:PAPER0;INK0
9983 PRINT:PRINTCHR(146);"
PRES (1) - TO PLAY"
9984 PRINTCHR(145);"
(2) - FOR INSTRUCTIONS"
9990 GETAB
    
```

```

9991 IFAB="1" THENCLS;RETURN
9992 IFAB="2" THENCLS;RETURN
9995 GOTO9990
9999 CLS;RETURN
10000 FORX=46864047079
10010 READM
10020 POKEXM
10030 NEXTX
10032 DATA0,8,16,63,16,8,0,0
10035 DATA63,63,63,63,63,63,63,6
3
10040 DATA63,33,33,33,33,33,33,6
3
10050 DATA63,12,45,63,63,30,12,6
3
10060 DATA6,14,14,14,4,7,23,31
10070 DATA7,5,4,4,4,12,28
10080 DATA0,6,63,21,21,63,0,0
10090 DATA7,1,11,15,7,5,31,63
10100 DATAA7,39,39,35,43,59,0
10110 DATAA8,56,52,44,56,40,62,6
3
10120 DATA61,57,57,49,53,55,50
10130 DATA33,18,12,30,45,45,63,3
0
10140 DATA4,2,4,14,14,14,14,14,1
4
10150 DATA30,63,51,51,51,51,63,1
3
10160 DATA33,45,49,45,49,45,33,3
0
10170 DATAA9,39,16,16,8,4,4,8
10180 DATA3,5,40,16,0,0,0,0
10190 DATA35,5,41,10,2,1,1,2
10200 DATA8,16,32,44,50,33,1
10210 DATA0,6,0,7,15,21,31,32
10220 DATA2,1,9,53,37,2,4,0
10230 DATA63,64,30,2,33,24,2,8
10240 DATA0,6,0,7,15,21,31,32
10260 DATA32,31,31,15,31,16,32,6
3
10270 DATA0,0,0,56,60,62,62,1
10280 DATA1,62,62,60,62,2,1,63
20000 RETURN
20010 REM*****HIGH SCORE!*****
*****
20011 IFSC(8(9)) THENGOTO20012ELSE
20301
20012 CLS:PAPER0;INK4
20013 PRINTCHR(149);"PLEASE ENTE
R YOUR NAME (14 LETTERS)"
20015 INPUTNM$
20016 IFLEN(NM$)>14 THENCLS;GOTO2
0013
20100 S(10)=SC
20210 NB(10)=NM$
20220 FORD=1070 TO 2 STEP-1
20230 IF S(10)<S(J-1) THEN20300
20240 TP=S(J-1)
20250 T=S(NB(J-1))
20260 S(J-1)=S(10)
20270 S(NB(J-1))=NB(J)
20280 S(J)=TP
20290 NB(J)=T
20300 NEXT J
20301 CLS:PAPER0;INK0
20302 FORI=1 TO 9
20320 PLOTS,M+3,STR(M)
20321 PLOT12,M+3,STR$(M)
20322 PLOT22,M+3,STR$(M)
20340 NEXTH
20341 PRINT:PRINTCHR(129);CHR(1
38);" INTERACTACTIC HEROES"
20342 PRINTCHR(129);CHR(138);"
INTERACTACTIC HEROES"
20350 FORX=1 TO 15;PRINT:PRINT
20360 PRINTCHR(146);"
PRES (1) - TO PLAY"
20370 PRINTCHR(145);"
(2) - FOR INSTRUCTIONS"
20380 GETAB
20390 IFAB="1" THENPING;GOTO61
20400 IFAB="2" THENPING;GOTO61
20410 GOTO20380
    
```

PCN's regular look at the new books — which are worth your money?



'101 puzzles to solve on your microcomputer' by Andrew Hilton, published by Harrap Books at £4.95 (paperback, 127 pages)

People love puzzles, but there's often much tedious legwork involved in them. In this book, some of the time-consuming chores may be taken from the puzzler's shoulders since it explains how to get your computer to do the repetitious parts.

Each problem requires substantial thought, and so, although there is little text, it could take many hours (probably weeks) to solve all the

puzzles.

What would have improved the book, and turned it into a programmer's tool, would have been to provide solutions, not just answers. These could have been programs, with comments explaining how the problems had been approached, or hints on the methods of solution. As it is, if you don't figure out what to do, or how the answer is reached, then you're given almost no hints in most cases.

The author's reason for not providing programs is thin, citing the graphics and POKE differences of machines. In fact, there are few programs there that require more than the simplest Basic routines. The publisher's other reason, to save paper, is also questionable since the cartoons (which are fun but take up a lot of space) could have been left plenty of other room for programs.

However, solving the problems is conducive to logical thinking and structured programming; sometimes frustrating and often fun. The puzzles are frequently in the school punishment vein, such as 'sweep the playground with a

toothbrush', but the micro can be used to do the tedious bit (sweeping) while you do the entertaining bit (watching).

So although stimulating, this could have been better. Another major problem is that the author hasn't taken into account that most micros slip into exponential notation when numbers get bigger than 32,767. Many of the puzzles require you to look at ten or 12 digit numbers, which get written as, for example, 3.676377E+9. **PL**

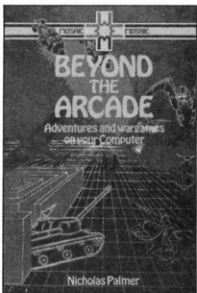
'Beyond the Arcade' by Nicholas Palmer, published by Mosaic at £6.95 (paperback, 151 pages).

A curiously unsatisfying book, this. It seems to be aimed at the gap between arcade gamers and that weird species on the fringes of civilisation, the wargamer/Dungeons and Dragons freak.

Although it pays lip service to games design by telling you about the financial side of games production, it doesn't actually set out to give programming tips. It therefore seems to fall somewhere between being a work of reference and an introduction to the more

thoughtful breed of computer game.

Unfortunately, this turns out as a disorganised series of potted reviews. The author doesn't review everything that's available, and there's no index, so as a work of reference it falls down drastically. This is a great pity, as Mr Palmer writes quite well, but the book as it stands is only likely to be of use to people who feel they might be interested in strategy games, and need something to fire their imagination. **JL**



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Atari software originals half price or less, disc and ROMs only. See for list or Tel: 021-357 3913 (Eve), T. J. Millward, Oakswell, Hill Lane, Gt. Barr, Birmingham.

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Epson MX-80 F/T II, complete with operation manual, £200. Epson interface for Apple II with graphics dump facilities also available. Tel: 01-854 5854.

Atari 810, "The Chip" with archiver, ORMS, W. H. Smith cassette recorder, £495 ono. Tel: Canterbury (0227) 750600.

Memotech MIX 500, boxed, perfect condition with leads, manual and six games. Bargains at £230. Tel: Tim, Boscawle 336, evenings.

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Oric-1 software originals - Zorgans, Xenon, Zodiac, Mushroom, Montecarlo, Starfighter, Two-Gun. Also books - Sixty Programs and Vince Apps. Bargain at £15. Tel: Durham (0385) 61924.

Victo 20 for sale, perfect condition, along with cassette player, 16K RAM expander, two excellent cartridges, several cassette games, joystick, V20 book, £130. Tel: Manchester 330-0383 after 5 pm.

Atari UCS for sale, excellent condition, with joysticks, paddles and Mattel Intellivision. Both with loads of games. Tel: 01-458 7826 after 6 pm.

Victo 20, C2N, 3K, plus software, £95 inc. P&P. 8K + Motherboard, £26. Speech Synth, £19. Monitor, £17. RS232, £9. Corf, Chest, Adventureland, Pirate Cove, £6 each. Tel: 0472 78058.

For sale: CSM64 software. Practical, intro to Basic, Ship of the Line Monopole, Microgem Cover, 64/Vic 20. Book - The Working 64. Tel: 0203-316599.

Commodore 64 software for sale. Hover Bover 4, Motor Mania £3.50, Falcon Patrol £4, Gridrunner £3.50. Tel: 041-779 2698.

TRS-80 Model 1 Level 2 48K expansion interface, Epson MX80/F/T printer twin 5 1/4" drives, TV monitors, lots software, £500 ono complete, business, games, w/processor. Tel: 01-2729212/35, 01-527 4559 office/home.

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Sharp MZ80K 48K, books, games, machine code monitor. All good condition. Just £250 for quick sale. Tel: Phil Martin on Gloucester (0452) 35330 evening or 01-2624 (office).

16K Spectrum DKTronics keyboard, Prism VTX500, over £250 software, worth £475. Sell for £255. Tel: 0389 285406 (Basildon) eves/wkends.

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BBC B 1.20S Microwave DDFS, Tech (800K) 4080 d/drive, MCP40 printer/plotter, cassette recorder, joystick, numerous games, utilities, EPROMS, disks, books, etc. £750. Tel: 0903 762093.

Commodore 64 software to swap or sell. Titles include: Colossus, Chess, Manie Miner and many more. Contact A Gerard, PO Box 116, Liege X, Belgique (All letters answered).

Vectors for sale one month old. Plus Spike and Solar Quest. All offers considered. Tel: 04626 71042 after 6pm, ask for Steven.

Software for Sharp MZ80K for sale. Various low prices including Wordpro V2.25 Pacman etc. Tel: 0352 711117 (07.00-10.00).

Electron software to swap or loan/exchange. Tel: Colin on Redcar (0642) 484785 or write: 42 Newmarket Rd, Redcar.

Tandy DMP 102 dot matrix printer. Used twice, complete with cable and software driver for CBM64, Centronics and serial compatible. £170. Tel: 0268 696638.

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IBM Selectric type golfball typewriter with Aulcar 735P Centronics interface. In working order, but needs slight attention. £100 ono. Tel: 0525 37155 after 5pm.

Sharp PC1500 + printer/plotter, cassette interface. All leads and two manuals included. £175. Tel: Rickmansworth 776947.

Oric 1 48K tape recorder games worth £35; manual and books worth £20; all lead, magazines and voice syn, £150 ono. Tel: 061-682 8453.

Oric 1 48K all leads etc. book, Zorgans Revenge, Hunchback, Harrier Attack, Starfighter, 1 year old, very good condition, £110. Tel: Stevenage (0438) 729300 after 6pm and weekends.

Apple disk drive (143K) £180; Apple parallel interface card and cable £70. Apple IIe joystick £25. All excellent condition. All three £250. Tel: 01-952 3891.

Software All Acornsoft originals £5-£7; Hobbit £8; 747 £3.50; Game Disks: Fortress, Zalaga, Chuckie Egg, Daredevil Denis, all on one disk £10. Tel: 01-848 4000.

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Commodore 64, C2N cassette deck, Programmer's Guide, hardly used, still boxed. Accept £200 for quick sale. Tel: 0676 64351 (Leigh) daytime, ask for Ian.

Atari 600XL computer, new, vgc, £130 ono. Also Atari software. Spectravision software, £150. Also software, Xenon-1 Z/Revenge, £5 each. Tel: Melton Mowbray 65986.

TRS80 model 1, level 2, green monitor, cables, software, £130 ono. Scriptit, £15. Flight Simulator, £80 each. X-matrix 8, £10 each. Tel: Welwyn Garden City 24591 after 6 pm.

48K Diskettes, unused: 5 verbatim 40 track RS-D2, £1.80 each. X-matrix 8, 40 track SS-D2, £2.50 each. Also head cleaning kit. Tel: Erith 48027 after 6 pm.

Oric 1 48K, C2N Cass. 1520 printer, Simon's Basic, books, cassettes, lots of software, modem, RS232 interface, joystick. All 3 months old, cost £530. Only £450. Tel: 0777 794506.

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Brother EP44, 3 months old 4 + 4 cartridges + 16 adaptors, £115 ono. Also files. Spectrum software (originals) for sale at 65% of original price. Tel: Nick, 500, 051-727 5344.

Oric 1 48K disk drive, disks, tape recorder, tapes, printer cable, Dragon User until April, sprites, 100 magazines, joystick, 5 books. Sell, £450 ono. Tel: 01-848 4000.

Wanted Mk14 computer, any Sinclair, Oxford or Cambridge calculators and Sinclair Microvision. International version. Tel: Allan Portaul, Alnwick 60464.

Atari software cassettes, ZXnon, Preppie, Fort Apocalypse, Datestones of Ryn, 29 each. Steeplejack, Diamonds, Count, Mystery fun house, Woodoo castle, £6 each. Tel: (0924) 890626.

Hobbit floppy tape unit (100K) for BBC micro including file system Epron, manual, tapes, etc. for £65 ono. Tel: 01-368 7561 evenings.

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Issue 8, April 29-May 6.

Programs: Atari Home Files Manager, Kobay's Vis; Star Trek (Vic 20); Hextest's Accounts for the Spectrum; Euron RX200 printer; NCR's Decision Mate V; Future Computer's FX30
Features: Microne; Compact programming on the T1994; Gameplay: Harvester (Vic 20); Strategic Command (Dragon 32); A first book of Micro Rhymes (BBC); Telling the Time/Money (Spectrum).
Program/Cards: Program Indexer (BBC B); CBM Database cards 1-4, Sort Extract.
Databases: software.

Issue 9, May 6-13.

Pro-Tests: Structured Basic on the Apple, Pixel Power on the Vic 20; Star DPS10 printer; Dams and Interop interfaces for Commodore 64; Micro-Professor.
Features: BBC functions keys; Atari word-processing part 1.
Gameplay: Dungeons of Intrigue (Oric); The Castle (Oric); Star Trek (Vic 20); Commodore (BBC B); Dragon Trek, Nowinski Puzzle (Spectrum).
Program/Cards: Lower case (Dragon 32); CBM database cards 5-6, Monster (Spectrum); Wildcard Search (MBase).
Databases: hardware.
Micro/Cards: Graphics; part 4.

Issue 10, May 13-20.

Pro-Tests: Infomast on Commodore 64; Dragon Maze; M2 and CMU80 music synthesizers (Apple); Prism directly coupled modems; Epson QX10.
Features: ZX81 graphics part 1; Atari word-processing part 2.
Gameplay: Rescue (Spectrum); Dictator (Spectrum); Roman Empire (Spectrum); M (Vic 20); Skyhawk (Vic 20).
Program/Cards: Union Jack; IBM Database cards 7-9; Evaluate (MBase); Formula (BBC B).
Databases: peripherals.
Micro/Cards: Graphics; part 5.

Issue 11, May 20-26.

Pro-Tests: BBC Turbo; PFS-File for IBM; Apple Family; printer comparison; Pocky/Jockey controller for ZX81 and Spectrum; Commodore Computer Board.
Features: ZX81 graphics part 2; Basic on the Sharp M280K.
Gameplay: Motor Mans (Commodore 64); Oric Flight; BBC Music Synthesizer; Music Maker (Spectrum); Embassy Assault (Spectrum); Tobor (Spectrum).
Program/Cards: Homework Bound (AS1); Connect Four (Dragon 32); CBM Database; cards 10-12.
Databases: Keywords.

Issue 12, May 27-June 2.

Pro-Tests: Spectrum word processor; PFS-Report on IBM; File Handling for Colour Genie; CP80 type 1 printer; TR Backfill; Sord MS.
Features: Epon Basic; Oric sound part 1; Tandy Colour graphics.
Gameplay: Mad Martha (Spectrum); French (Spectrum); Head-banger (Spectrum); Oric roundup; Program/Cards: Election Barbart (Commodore 64); Money Utility (BBC B); March (Spectrum).
Databases: hardware.
Clubset: clubs (Cambridge Micro-computer Club special).
Micro/Cards: Disk Drives; part 1.

Issue 13, June 3-9.

Pro-Tests: Teletext for Dragon 32; Aberforth Forth for Spectrum; GFS graphics processing system for Apple II; jysticks; ralph; Atari; Features: Dragon meets Tandy; Oric music part 2; transferring music for Colour Genie and Genie 1.
Gameplay: Everest Ascend (Spectrum); Colour Genie roundup; Micro Maze (Jupiter Ace); Oric (Atari).
Program/Cards: Cupid (Oric); Alien (Dragon 32); Time Bomb (Atari).
Databases: peripherals.

Issue 14, June 10-June 15.

Pro-Tests: Apple Accelerator II board; Modula 2 (Apple II); Oric; Joy-Drive; Control Unit B2; Kempston Centronics II Interface; BBC Speech Synthesizer.
Features: Newbrain Basic part 1; Sirius designing.
Gameplay: As Didiums (Spectrum); Monopoli (Commodore 64); Automonopoli (Spectrum); Dragon dramas.
Program/Cards: Time Bomb (Atari); cont.; Sheep Drive (BBC B).
Databases: Software.
Micro/Cards: Spectrum; Part 1

Issue 15, June 16-June 22.

Pro-Tests: Com3 35; Address Manager (Spectrum); Sytax (Commodore 64); MS1 Database (Epon HX 20); Voice Input Modem (Apple II).
Features: Newrain Basic part 2; Genie scene.
Gameplay: Cleared for Landing; Playing the Ace (Apple II); Vals; Star Jammer (Dragon 32).
Program/Cards: Mover (BBC B); Sprit Clock (Commodore 64); Pirate Island (Atari); 3 of 9; M (Colour Genie); Brickbat (Dragon 32).
Databases: Hardware.
Micro/Cards: Spectrum; part 2.

Issue 16, June 23-June 29.

Pro-Tests: Atari V; Acorn, word processing for the Commodore 64; Feuilleille (CPM); MPF-II (Epon Z80 Pack for BBC).
Features: ZX81 Maths; US mail (Spectrum); Atari spiders (Spectrum); Education Scorable (Spectrum); Education (BBC); Computer Art; Bowling (Spectrum); Catcha Snatcha (Vic 20).
Gameplay: Video Tiler (T1994A); 3 of 6; Bowling (Spectrum); Pirate Island (Atari) cont.
Micro/Cards: Spectrum; part 3.

Issue 17, June 30-July 6.

Pro-Tests: Duet-16; The Organizer (CPM); Trace and ZX81 (Spectrum); Jaki 6100 daisywheel; Vidi Term (Apple II).
Features: Learning part 1; Atari screen action.
Gameplay: Music chess; Grand Master (Commodore 64); Escape from Orion (BBC); Jet Pac (Spectrum); M (Colour Genie) (Dragon 32); Spectrum special.
Program/Cards: Video Tiler (T1994A); cont.; Pirate Island (Atari) cont; Word processor (BBC B).
Micro/Cards: Sound; part 1.

Issue 18, July 7-July 13.

Pro-Tests: ZX81; ROM; RS232 interface (Tandy); ROM page (Commodore); Interface printer buffer; IBM Personal; Basic; Spectrum assembler; Newrain WP.
Features: Learning part 2; Lymx music.
Gameplay: Spectrum; Backgammon; BBC Snooker; Commodore 64 round-up; Serpentine (Vic 20); Post (Spectrum); Spectrum Safari.
Program/Cards: Word Processor (BBC); Fruit Machine (Spectrum).
Micro/Cards: Sound Part 2.

Issue 19, July 14-July 20.

Pro-Tests: 16-bit chips; Stock cont.; Epon RX200; Malplus (Torch); Smith-Corona daisywheel; Spectrum processing; ZX81; Features: Insurance; buying second-hand.

Gameplay: Escape MCP (C64); Escape from Perilous (Atari); Axi-Joy-Drive; Control Unit B2; (C64); Airline Centronics II; Temp on Spectrum.
Program/Cards: Colour Code (Atari); Wreck (Dragon); cont.
Micro/Cards: Sound; part 3.



Issue 20, July 21-July 27.

Pro-Tests: Rade board; Vic digital tape drive; Seikoba colour printer; Toolkit (Spectrum); Bonus (Pet payroll); Newrain monitor.
Features: Computer art; Dragon scrolling.
Gameplay: Rabbit Trail (T1994a); Aztec Challenge (Atari); Vic 20; T1994a); BBC round-up; Joust (Spectrum); Molar Mail (Spectrum); Print Shop (Spectrum); Time-Lords (BBC).
Program/Cards: Tumbler (Oric); Wreck (Dragon); Atari Errors; Speed Race (Vic 20).
Micro/Cards: Sound; part 4.

Issue 21, July 28-August 3.

Pro-Tests: BBC graphics; Newrain assembler; BBC turtle; Oric printer; Triumph printer.
Gameplay: Franklin's Tomb (Dragon); Hammer House of Horror (Spectrum); Jumpman (64); Jumping Jack (Spectrum); Fourth (Spectrum); Vic Cyclons (64).
Program/Cards: Collection (Vic); Bomber (64); Definer (BBC).
Micro/Cards: Sound; part 5.

Issue 22, August 4-August 10.

Pro-Tests: Spectrum Forth; BBC graphics; Music synthesizer; IBM plotter; Brother daisywheel; Malpin keyboard; Mapid.
Features: Genie assembler; Dragon machine code.
Gameplay: River Rescue; Oric Attack (Atari); Zork (64); Knot in 3D; 3D Combat Zone (Spectrum); M (Oric); Velnor's List (Spectrum).
Micro/Cards: CPM part 1.



Issue 23, August 11-August 17.

Program/Cards: CPM; part 2.
Pro-Tests: Atari 60KX; Conder Series 20 (IBM); Acacia non-linear; Duryling system (Oric); ROM extension board (BBC).
Features: Oric sound routines; Spectrum; Greely Gulch (Spectrum);

machine code.
Gameplay: Oric roundup; Cooke, Egg Farm; Xadom (Spectrum); Sea Lord (BBC); Lastican (Dragon); The Island (64).
Micro/Cards: Commodore 64; part 1.



Issue 25, August 25-August 31.

Pro-Tests: Electron; Summit Basic; Oric monitors; Microdrive.
Features: Newrain map; Acorn Atom; Dragon machine code; Spectrum; Suspended (64); Terror Dakis; Tranz AM (Spectrum); Dragon roundup; Jagger (Oric); Frogger (IBM).
Micro/Cards: Commodore 64.

Issue 26, September 1-September 7.

Pro-Tests: Micron 65; HCPL; BBC tracer; 80 column PET; interfaces.
Gameplay: Magic Mountain; Smuggler (Spectrum); Spectrum roundup; Matrix (64); Ninja Warriors (Dragon); Dallas (Oric); Call to Arms (BBC).
Micro/Cards: Commodore 64.

Issue 27, September 8-September 14.

Pro-Tests: Sharp M270; BBC Lin; Apple editor; IBM; Mice; ZX81 surgery.
Gameplay: Zip-Zap; Zoom; Spectrum roundup; Hover Beaver; Beni-Jep Spectrum (64).
Micro/Cards: Dragon; part 4.

Issue 28, September 15-September 21.

Pro-Tests: Zenith Z100; Small Logo; Atari Supergraphics; Newrain CPM; IBM mice.
Gameplay: The Witness; Super Scramble; Six (64); Harter Attack (Oric); Matorco Grand Prix (Dragon); Pharaoh's Tomb (Spectrum).
Micro/Cards: Dragon; part 5.

Issue 29, September 22-September 28.

Pro-Tests: Portico Miracle; Dragon toolkit; BBC; Oric; Atari; Features: HX20 disassembles; TI microformations.
Gameplay: Griddler; Glooper; California Gold Rush (64); Oric roundup; Bomb Alley (BBC); Split; General Election (Spectrum).
Micro/Cards: Dragon; part 3.

Issue 30, September 29-October 5.

Pro-Tests: NEC's Advanced Personal Computer; Financial Planner (IBM); Kingman's a.b.c. Extended Basic; Top Spouter (Spectrum); Prism VTX800; Contended Basic (Dragon).
Gameplay: Spectrum machine code; Gameplay: Halls of Death/Sword of Destiny Flight Simulator (BBC); (BBC); Dragonfly (Dragon 32); Forensic Note Invoices (Dragon 32).
Program/Cards: French Text (Apple); Babyfall (ZX81); Cont (Vic 20); Mord Ards (Vic 20); Road Hog (BBC).
Databases: Hardware.
Clubset: Everything you wanted to know about programming; part 5.



Issue 32, October 13-October 19.

Pro-Tests: Mated Computer Adaptor; Introversy; Sprite-Gen (BBC); Typing Strategy (Apple); Mica; 2 (Spectrum); Critch Egon Program (Apple).
Features: Teletext options; Inside the exotic.
Gameplay: Space Shuttle Frogger (Dragon 32); Atari roundup; Spectra 2/Football Pool Program (Spectrum).
Databases: Software.
Clubset: Clubs.
Programs: Bees Away (BBC); Composer (Oric).
Micro/Cards: Everything you wanted to know about programming; part 3.

Issue 33, October 20-October 26.

Pro-Tests: Atari 60KX; Conder Series 20 (IBM); Acacia non-linear; Duryling system (Oric); ROM extension board (BBC).
Features: Oric sound routines; Spectrum; Greely Gulch (Spectrum);

Issue 34, October 27-November 2.

Pro-Tests: NEC's PC-8201A; Simply File (64); The Forest (Spectrum); Amcom DFS (BBC); Currah Microscope (Spectrum).
Features: Oric Machine Code; Gameplay: For Apocalypse/ Pooyan (Atari); Death Cruise/ Chief (Dragon); Trench Canyon (BBC); Football Manager/Pool (Spectrum).
Program/Cards: Key Utility (L1); Connect Four (Dragon 32); French Test Card (Apple).
Databases: Keyword.
Clubset: Everything you wanted to know about programming; part 4.

Issue 35, November 3-November 9.

Pro-Tests: Kaypro II; Stock 9; Atari 60KX; Conder Series 20 (IBM); Acacia non-linear; Duryling system (Oric); ROM extension board (BBC).
Features: Oric sound routines; Spectrum; Greely Gulch (Spectrum);

Issue 36, November 10-November 16.

Pro-Tests: Atari 60KX; Conder Series 20 (IBM); Acacia non-linear; Duryling system (Oric); ROM extension board (BBC).
Features: Oric sound routines; Spectrum; Greely Gulch (Spectrum);

Issue 37, November 17-November 23.

Pro-Tests: Atari 60KX; Conder Series 20 (IBM); Acacia non-linear; Duryling system (Oric); ROM extension board (BBC).
Features: Oric sound routines; Spectrum; Greely Gulch (Spectrum);

Issue 38, November 24-November 30.

Pro-Tests: Atari 60KX; Conder Series 20 (IBM); Acacia non-linear; Duryling system (Oric); ROM extension board (BBC).
Features: Oric sound routines; Spectrum; Greely Gulch (Spectrum);

Multi-Square (Oric).
Databases: Peripherals.
Microproia: Everything you wanted to know about programming, part 6.

Issue 36, November 10-November 16.
Pro-Tests: Tiger from H.H. ZX81-Forth, Exmon (Oric), Cycle Planner, Growth Tracker/Diet/Diet Master (Spectrum), U-Com 2 (Apple).
Features: Newbrain sound, BBC FX commands.
Gameplay: Creeps (Vic 20), Extremator (64), Spectrum roundup, Death Mines of Sirius (Dragon 32).
Programs: Falklands Raid (BBC), Mini Math (Spectrum), Pyramid (Spectrum).

Databases: Software.
Microproia: Everything you wanted to know about programming, part 7.

PERSONAL COMPUTER NEWS

Issue 35, November 3-November 9.
Pro-Tests: Apicot, Paint (Atari), BBC Micro Tutors, Spectravideo Compumatic (Atari VCS 2600), Big Ears.
Features: Flight simulators, Spectrum screening.
Gameplay: Empire/Treasure Tomb, Crystal Chalice, Temple of Zores (Dragon 32), Cobas Maze/Bewitched (Vic 20), Cosmic Cowboy/Planetfall (64), Bugaboo (Dragon).

Programs: City Defense (Oric), Falklands Raid (BBC), Pyramid (Spectrum), Monitor (64).
Databases: Clubnet.
Microproia: Everything you wanted to know about programming, part 8.

PERSONAL COMPUTER NEWS

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Programs: City Defense (Oric), Falklands Raid (BBC), Pyramid (Spectrum), Monitor (64).
Databases: Clubnet.
Microproia: Everything you wanted to know about programming, part 8.

PERSONAL COMPUTER NEWS

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Pro-Tests: Coloco's Adam, Small Business Accounts (Spectrum), Masterfile (BBC), Monitor roundup.
Features: Apple programming, NewBrain editor part 1, Dragon action part 1.
Gameplay: Dragon roundup, Zepplin-Blue Max (Atari), Skramble/Falcon Patrol (64), 737 Flight simulator (BBC).
Programs: Shipment (Spectrum), Monitor (64).
Databases: Hardware.
Microproia: Guide to Monitors.

Issue 39, December 1-December 7.
Pro-Tests: Dragon 64, Tandy CGP-220, White Knight II (BBC), Cross Reference Utility (IBM).
Features: NewBrain editor part 2, Dragon Action part 2.
Gameplay: Oric roundup, Haunted Hedges/Corridors of Genos (Spectrum), Microbe One Hundred & Eighty (BBC), Atari roundup.
Programs: Lower CLS (Spectrum), Shipment (Spectrum), Monitor (64), Basic Search (BBC).
Microproia: Buyer's Guide to Micros.



Issue 40, December 8-December 14.
Pro-Tests: Timex 2808, Thermal Printer TP-10, Cambridge Computing joystick (Spectrum), BeebSynth/The Synth/Music Processor (BBC), Vizawire/Vizaspell (64), Education games (Spectrum).
Features: NewBrain editor part 3, Dragon Action part 3.
Gameplay: Pinball Wizard (Vic 20), The Quest of Mervall (64), Way No Way/Savage Pond (Atari).
Programs: Link Four (Spectrum), Tilt (Dragon).
Microproia: Buyer's Guide to Peripherals.

Issue 41, December 15-December 21.
Pro-Tests: Apple II, Byte Drive 500, INMAC/Power Cleaner, Commodore 1700 Colour Monitor, Basic (64), Database/MST-Calc (Dragon).
Features: Computerised Psychotherapy (BBC), Spectrum Display.
Gameplay: MicroPop/Pettigrew's Diary (Dragon), 64 roundup, Dimension Destructors/Sheep Panic (Spectrum).
Programs: Colony Invader (Spectrum), Grid Bike (Vic 20).
Microproia: Buyer's Guide to Software.

Issue 42, December 22-January 4.
Pro-Tests: Spectrum add-ons (U-Microcomputers systems), Orion/Star Games Designer (Spectrum).
Features: Micros of 1983, Computer Security, BBC word processing, Dragon Action part 4.
Gameplay: International Football (Spectrum), Grand Chequered Flag (Spectrum), Way Out/Butt Banger Jack (Atari).
Programs: Guess Who's Back/Enders/Outback (Vic 20), Danger Ranger/Up Perspective (Dragon 32).
Databases: Submit.
Microproia: Games Special.

Issue 43, January 7.
Pro-Tests: IBM Junior, Grafpad (BBC), Walters WM80 printer Desvax (Spectrum).
Features: Computerspeak, Spectrum Display, Tabs on Oric.
Pro-Tests: Trace Race/Pinball (Dragon 32), Colour Gene roundup, Hunter Killer/Mr Wimpy (Spectrum), Crazy Game/Mr Goodness Gracious (64).
Programs: Jungle Chase (Oric), Screen Dump (BBC).
Databases: Hardware.
Microproia: Electron part 1.

Issue 44, January 14.
Pro-Tests: Hitachi MBE-1602, Acorn Teletext (BBC), Integrex Colourjet printer, DTI, Base (Spectrum), Hitachi 4251/Multifont (Spectrum).
Features: Adventure games, Colour Gene character, Spectrum.
Gameplay: Devil Assault/Waps & Dragon Race (Dragon 32), Siren City, Fox and the Fox (64), Survival/Countdown (Vic 20).
Programs: Minifield.
Databases: Peripherals.
Microproia: Electron part 2.

Issue 45, January 21.
Pro-Tests: Portables - Commodore SX60, Olivetti M10E, Commodore sparkjet printer, Turbo 20 (day) wheel, Spectrum educational software, BBC graphics extension ROM.
Features: Bargain buys; Making the most of your money.
Gameplay: Viking and Pub King (Dragon), Traxx and Wild West Hero (Spectrum), Atari/Commodore 64 roundup.
Programs: Latteststar Fighter (Spectrum), 64.
Databases: Software.
Microproia: Electron part 3.



Issue 46, January 28.
Pro-Tests: Apple Macintosh, BBC sideways ROM board, IEEE interface for Commodore 64, Silver Reed EX44 typewriter/printer, Bridge on Spectrum and Dragon; BBC filing program.
Features: Buying by mail order; programming the Memotech.
Gameplay: Barky Burgers and Gangsters (Spectrum), Birds Barage and Plummy (BBC), Blue Moon and Dancing Fancs (Commodore 64).
Programs: Caves of Treasure (ZX81).
Microproia: Modems and communication.

Issue 47, February 4.
Pro-Tests: Sinclair QL: Atari Touch Tablet; Silver Reed EXP500 day) wheel; IBM Cobot; BBC Spell Check.
Features: Programming the Memotech part 2; Low cost printers.
Gameplay: Mothership and Quintic Warrior (Commodore 64), Two Gun Turtle and Multigames (Oric), Apple adventures, Spectrum roundup.
Programs: Pot Hole (Dragon).
Databases: Hardware.
Microproia: A to Z of Atari part 1.

Issue 48, February 11.
Pro-Tests: Spectravideo 328; Atari 800XL, Dragon 3in disk drives, low cost monitors; Aztec C (Apple); BBC educational software.
Features: Sideswys printing on Epson HX20.
Gameplay: Bedlam and Morris Moves the Bikers (Spectrum); BBC educational software; Zoragon's Kingdom and Flight Zero (Spectrum).
Programs: Gridtrap (Lynx).
Databases: Peripherals.
Microproia: A to Z of Atari part 2.

Issue 49, February 18.
Pro-Tests: Oric Atmos; tracker ball controllers; Spectrum speech synthesizers; Rainbow Writer (Dragon); Colour Gene assembler; Spectrum educational programs.
Features: Computer jargon; 42-column display on Spectrum.
Gameplay: Quidrant and Jerpac (Atari), Crazy Broom and Pumpcatchers (Commodore 64).
Programs: Sprite generator (Commodore 64).
Databases: Software.
Microproia: A to Z of Atari part 3.

Issue 50, February 25.
Pro-Tests: Sanyo MBC550; Commodore speech synthesizer; BBC real-time control interface; BBC machine code trace; Atari home utilities.
Features: Expanding your Spectrum; introduction to Lisp.
Gameplay: Urthona Upstart and Goddila and the Martians (Spectrum), Shuttlezack and Hooked (Dragon).
Programs: Minescape (Oric).
Clubnet
Microproia: Printers part 1.

Issue 51, March 3.
Pro-Tests: Sharp's PC5000, Graphics Pack (Oric), Fancy Font (CPM, Torch), Superbase Application Database (64), Printer roundup - IEEE 488 interface (BBC).
Features: Microdrive data files.
Gameplay: Spectrum selection, Robotops (TP994A), Battly Birds/Brinslet (Atari).
Programs: Millipede (BBC/Electron).
Databases: Hardware.
Microproia: Printers, part 2.

Issue 52, March 10.
Pro-Tests: Wren, MSX, Multisynth 64, Mr T's Number Games etc (BBC, Spectrum, 64), Hybrid cable (Oric, Atmos).
Features: Adventure games.
Gameplay: Dragon roundup, Snorters/Free Fall (BBC), Spectrum roundup.
Programs: UFO (Vic-20), Morse Code (BBC), Gary the Guitlar (64).
Databases: Peripherals.
Microproia: Printer, part 3.

Issue 53, March 17.
Pro-Tests: Yamaha YFS01, Tandy TRS-80 modem (RS232), MD/DS (BBC), Toolkit (BBC), The Quill (Spectrum).
Features: Screen technology, Atari graphics.
Gameplay: Megahawk/Megawarz



Issue 54, March 24.
Pro-Tests: IBM's Portable PC, Spectrum keyboards, Beeftoon, Screen Design (Vic 20).
Features: Atari graphics, Chip shortage.
Gameplay: Airstrike 2/Pole Position (Atari), Deathace/Fighter Pilot (Spectrum), BBC roundup.
Programs: Orpheo (64), CluPart (CGL M.5).
Clubnet
Microproia: User groups and charts.
Microproia: Atmos, part 2.

Issue 55, March 31.
Pro-Test: HP-150, Light pens (BBC, 64), Micro-Prolog (Spectrum), Electron Graphics System, Features: Spectrum routines, Consumer rights.
Gameplay: Patience/Metagalactic Llamas Battle at the Edge of Time (Vic-20), Loka/Loat (Atari), Tennis (Atari).
Programs: Fax Draw (Dragon 32), Flash simulator (Atari).
Databases: Hardware.
Microproia: Communications, part 1.

Issue 56, April 7.
Pro-Tests: Veratex Type 'n Talk, MicroCommand (BBC, Spectrum), 64, Commodore 100i disk drive, Apple's Macintosh, Animator (Dragon 32), Knoware (IBM).
Features: Spectrum maths, Advances in history.
Gameplay: Hunchback Aztec Challenge (64), Defence Force/Psychic II (Oric), Volcanic Planet (Spectrum).
Programs: Age King (Vic-20), Lynx VAL.
Databases: Peripherals.
Microproia: Communications, part 2.

Issue 57, April 14.
Pro-Tests: Microkey, Moresk Disk Drive Interface (Spectrum), Atari 1020 colour printer/plottter, FT Monowire (IBM PC, Sirius).
Features: Assembly course, Portable.
Gameplay: Learning games (Spectrum, Oric), Air Traffic Control/56, Spy (Dragon), Neptune's Daughters/China Miner (64).
Programs: Trainia (BBC), Electron, Oric, Spectrum.
Microproia: Communications, part 3.

(64), Castle of Doom/Fishy Business (Dragon 32).
Programs: Battle Stations (Spectrum).
Databases: Software.
Microproia: Reaching for the Atmos, part 1.



Issue 58, March 31.
Pro-Test: HP-150, Light pens (BBC, 64), Micro-Prolog (Spectrum), Electron Graphics System, Features: Spectrum routines, Consumer rights.
Gameplay: Patience/Metagalactic Llamas Battle at the Edge of Time (Vic-20), Loka/Loat (Atari), Tennis (Atari).
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Databases: Hardware.
Microproia: Communications, part 1.

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Programs: Trainia (BBC), Electron, Oric, Spectrum.
Microproia: Communications, part 3.

Issue 61, April 21.
Pro-Tests: IBM Junior, Grafpad (BBC), Walters WM80 printer Desvax (Spectrum).
Features: Computerspeak, Spectrum Display, Tabs on Oric.
Pro-Tests: Trace Race/Pinball (Dragon 32), Colour Gene roundup, Hunter Killer/Mr Wimpy (Spectrum), Crazy Game/Mr Goodness Gracious (64).
Programs: Jungle Chase (Oric), Screen Dump (BBC).
Databases: Hardware.
Microproia: Electron part 1.

Issue 62, April 28.
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Features: Adventure games, Colour Gene character, Spectrum.
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Programs: Minifield.
Databases: Peripherals.
Microproia: Electron part 2.

Issue 63, May 5.
Pro-Tests: Portables - Commodore SX60, Olivetti M10E, Commodore sparkjet printer, Turbo 20 (day) wheel, Spectrum educational software, BBC graphics extension ROM.
Features: Bargain buys; Making the most of your money.
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Programs: Latteststar Fighter (Spectrum), 64.
Databases: Software.
Microproia: Electron part 3.

Issue 64, May 12.
Pro-Tests: Apple Macintosh, BBC sideways ROM board, IEEE interface for Commodore 64, Silver Reed EX44 typewriter/printer, Bridge on Spectrum and Dragon; BBC filing program.
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Microproia: A to Z of Atari part 1.

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Gameplay: Pinball Wizard (Vic 20), The Quest of Mervall (64), Way No Way/Savage Pond (Atari).
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Programs: Jungle Chase (Oric), Screen Dump (BBC).
Databases: Hardware.
Microproia: Electron part 1.

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Apple bits

Mice are getting to be pretty popular little creatures, and users of mice are no doubt finding out that, if you keep rolling them across your

desk, blobs of fluff get caught up in the little ball they run on.

But never fear, Apple has come to the rescue. In the current Apple Macintosh catalogue there is an entry for 'mouse balls'. None for me, thank you . . .

That European touch . . .

NOTICE

This Catalog is made for especially european user, to make it clear and easier to understand and use the ASCII Code and Character. We hope you, european user and the users who make papers to Europe, enjoy our printers' excellent ability.

Hats off this week to Tandy, which has taken the trouble to produce an operations manual (catalog number 26-1254A) specifically for European users. At last, an end to Americanese.

Here is a sample, for which John Negus from Pont d'Arc collects £5 (FF57 approx) in the Great PCN Gibberish & Misprints Hunt. Other entries, of course, will be gratefully received.

NEXT WEEK

Unicom - Has Torch taken a chance naming its cheap Unix option after a mythical beast? Find out in our cover feature.

Graphics bonus - We look at Atari graphics and move to the second part of our examination of Dragon sprites.

Mousetrap - The Apple mouse is covered in this exhaustive review.

Memotech - Disk units for the

Awake, awake . . .

It's been said more than once that a wind of change is blowing through the micro industry. It's also been said that many manufacturers will have to wake up to the reality of the market. It has never been put more succinctly than by a Tandy spokesman on the difficulties at Dragon Data.

'At Tandy,' he said, 'we've always had the feeling that some manufacturers were sailing too close to the wind and as a result would fall out of bed.' Such is the stuff nightmares are made of.

And we trust other manufacturers are not sleeping too soundly.

Memotech 512 come under the microscope.

Flight 64 - Take off with our review of Sublogic's Flight Simulator II.

Gameplay - Reviews of the latest thrills and spills on Dragon and Spectrum.

SANTAX ERRORS

Misplaced

Asbury Computer Centre's S-22 Microsystems Toolkit for the Dragon escaped more or less unscathed from the eighth plague - typographical errors - in last week's Pro-Test. But we got the supplier's address and telephone number wrong. Asbury Computer Centre is at 247 Ashby High Street, Ashby, Scunthorpe, South Humberside, and the phone number is 0724 871756.

Eye and hand coordination

Robots get more and more popular, and soon every micro will have one. Memotech is in the forefront as far as robotics is concerned - the company's entry in the Earls Court Computer Fair show guide insists (repeatedly) that the Memotech MTX512 has a '16K Videarm'.

The crush at the stand was too great for PCN to check it out, but we suspect it of being a video camera on a robot arm . . .



PCN DATALINES

PCN Datelines keeps you in touch with up-coming events. Make sure you enter them in your diary. Organisers who would like details of coming events included in

PCN Datelines should send the information at least one month before the event. Write to PCN Datelines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

UK EVENTS

Event	Dates	Venue	Organisers
Compec North	June 19-21	Belle Vue, Manchester	Reed Exhibitions 01-643 8040
National Conference and Exhibition on Computers in Personnel	June 26-28	Royal Lancaster Hotel, London	Peter Mirrington Exhibitions 0277 232030
Networks 84	July 3-5	Wembley Complex	Online Conferences 01-868 4466
PC User Show	July 3-5	Novotel Hotel, London W6	Daniel Evans 01-837 3699 ext 244
Microtrade '84	July 4-6	Barbican, London	Mountbuhl Ltd 01-486 1951
Artificial Intelligence for Society Conference	July 6	Brighton Polytechnic	Dr Gill, 0273 693655
What Micro? Computer Show	July 14-15	Battersea Park, London SW11	Sue Holliday, VNU 01-636 6890
Electron & BBC Micro User Show	July 19-22	Alexandra Palace, London	Database Publications, 061-456 8383
Acorn User Exhibition	August 16-19	Olympia, London	Computer Marketplace Exhibitions 01-930 1612
Electron & BBC Micro User Show	August 31-Sept 2	UMIST, Manchester	Database Publications, 061-456 8383
Computer & Software Exhibition	September 11-14	Anderson Centre, Glasgow	Trade Exhibitions, 0764 4204

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
National Computer Conference and Exhibition	July 9-12	Las Vegas, USA	American Federation of Information Processing Societies Inc. 0101 703 620 8900

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